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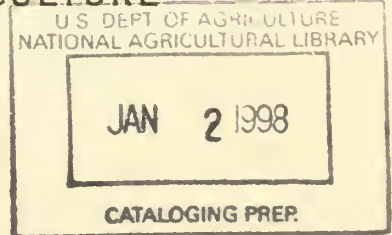
AGRICULTURAL HISTORY SERIES NO. 2

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**Some
Landmarks
in the History
of the
Department of
Agriculture**



UNITED STATES DEPARTMENT OF AGRICULTURE



This series is intended as a vehicle for presenting the results of research in agricultural history conducted throughout the Department of Agriculture. Edited in the Bureau of Agricultural Economics, with the aid of a Department advisory committee, the series will include monographs issued at irregular intervals as valuable materials and results of research become available.

FOREWORD

"Some Landmarks in the History of the United States Department of Agriculture" has been gleaned from the official annual reports relating to agriculture, from the beginnings in the Patent Office to date. The annual reports of the Patent Office starting with 1837 and extending through 1861, the reports of the Commissioner of Agriculture beginning with 1862, and finally the reports of the Secretary of Agriculture from 1889 have been searched for data as to significant developments. These volumes constitute a valuable contemporary record of the Federal activity relative to agriculture. The record is, of course, incomplete. The significance of some developments is not always apparent to the observer. Furthermore, the annual report of a Government official may be directed primarily at recording and evaluating events which the individual himself thinks most important, to the neglect of happenings that may seem more important from a different viewpoint. Nevertheless, the record is valuable. It serves well as an introduction to further historical study of the aims, methods, and achievements of the Department of Agriculture.

O. C. Stine

DEPARTMENT COMMITTEE ON AGRICULTURAL HISTORY

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SOME LANDMARKS IN THE HISTORY OF THE DEPARTMENT OF AGRICULTURE

T. SWANN HARDING

Editor of USDA, The Employee News Bulletin

The United States Department of Agriculture grew directly out of the Patent Office which was established April 10, 1790. During the 1830's the newly reorganized Patent Office, then in the State Department, undertook to distribute seeds and collect agricultural statistics. Out of these activities developed the basis for a separate agency devoted exclusively to the interests of agriculture.

George Washington, who had personally urged the passage of the first patent act, himself, examined and signed the original patents, along with his Secretary of State, Thomas Jefferson. This system proved slow and cumbersome, for even then the President and his Secretary of State had many other urgent matters to distract their attention. So in 1793 a system of patent registration was established. Under this arrangement patents were merely registered and recorded. Until 1802 the Patent Office occupied one room in the Department of State, and most of its work was performed by a single part-time clerk.

Under the registration system the Secretary of State could not refuse a patent, if application were duly made. No presumption of patent validity was required and chaos ruled. Consequently, agitation for a better law began, and on July 4, 1836 President Jackson signed the new act which established the existing patent system under a Commissioner of Patents. In the 1830's the patents granted in the field of agriculture outnumbered all others, as was natural in an agrarian nation.

The first Patent Commissioner under this new law, Henry L. Ellsworth (1791-1858), son of the third Chief Justice of the United States Supreme Court, Oliver Ellsworth, was born in Connecticut and was graduated from Yale in 1810. Ellsworth practiced law, but he also farmed and was a leader in the Hartford County Agricultural Society. He became president of a large insurance company and was active in business and civic life. He resigned as mayor of Hartford in 1835 to become head of the Patent Office on June 15 of that year.

Naturally Ellsworth took a very real interest in agriculture from the start. In his annual reports for 1837 and 1839, dated January 1, 1838 and 1840 respectively, he requested funds from Congress to be used for collecting and distributing seeds and compiling agricultural statistics. He reinforced this plea in a special letter of January 22, 1839 addressed to Isaac Fletcher, chairman of the Committee on Patents of the House of Representatives, who had requested further information. In 1839 Ellsworth received permission to expend \$1,000 of the patent funds for the agricultural purposes he had specified. As a result the Agricultural Division was set up in the Patent Office.

HOW FORMAL ESTABLISHMENT CAME ABOUT

Many years later, on May 15, 1862, President Abraham Lincoln signed the bill establishing what is now the United States Department of Agriculture as a separate agency with bureau status, headed by a commissioner of its own. On February 9, 1889 the Department was raised to Cabinet rank. Its supervising officer automatically became the Secretary of Agriculture.

Why did these things take place when they did? How did it happen that agricultural work began in the Patent Office? Why was it later given bureau and still later departmental status? What caused the growth of the Department of Agriculture? No definitive answers can be given to these questions until further careful research has been made, but a few tentative conclusions are in order.

Many factors operate in such instances, notably agitation by pressure groups demanding specific action to be taken by the Federal Government through some appropriate agency. At no time in its history could an observer survey the Department and show that it had sprung full-grown from the brow of the bureaucrat. A study of the Department's development reveals instead that its work was expanded by Congressional authorization at successive periods of the country's history, often because different groups of citizens demanded that something be done about something in the field of agriculture, and it seemed best that the Federal Government do it.

Of course certain other factors also tend to expand the functions of governmental agencies. Once research studies are authorized, informative new knowledge comes into existence, and the necessity is recognized—both by those inside the Government service and by the public—for additional research or regulation. Thus knowledge begets knowledge and points the way to action. Again, the very existence of administrative resources—equipment, laboratories, trained personnel—often leads to the passage of new laws, in order that these resources may be utilized for the Nation's welfare.

Emergencies, like those created by the rapid rise of technology, wide-spread animal or plant ills, insect infestations, duststorms, droughts, floods, the exploitation of forests, the necessity for better communication, or economic depressions compel the Government to take action in new fields. Outstanding personalities, like Henry L. Ellsworth, Seaman A. Knapp, Gifford Pinchot, and Harvey W. Wiley, from time to time enter the service of a governmental agency, and also have a determining influence upon the allocation of functions. In general the organization of economic activity in this country at a particular time determines whether Federal or State power will be invoked to extend a specific type of aid demanded or projected.

There is nothing new about public aid to agriculture. For the farmer always battled the elements on a precarious basis, and far back in history, before commercial farming became a reality, government had to aid him every now and then if only to guarantee the food supply. Even harsh dictatorial regimes, like that of the Great Khan about whom Marco Polo wrote in his celebrated *Travels*, have taken such action.

SUBSISTENCE FARMING DELAYED MATTERS

Coming more directly to the question of why we did not have a Department of Agriculture immediately after the Revolutionary War, it may be said that subsistence farming was then the occupation of most of our people. The farmer of those days needed relatively few things that had to be bought with cash and required comparatively little governmental aid.

It is true that small sums of money had been granted from time to time for the promotion of specific agricultural projects even in the colonial period. As early as 1622, King James I encouraged the growing of mulberry trees and the breeding of silkworms. Many other products of colonial husbandry, including hemp and flax, indigo, naval stores, cotton, and sheep, received Parliamentary or local subsidy at various times. Measures were also passed to expand or contract the acreage of a particular commodity. Taken all in all, however, such regulations had comparatively little direct effect on the typical husbandman of the period.

Toward the end of the eighteenth century the famous French gourmand, Jean Anthelme Brillat-Savarin spent some time in the United States. In his *Physiology of Taste* (Meditation VI, No. 38) he described an excellent meal he had had with a Connecticut farmer in 1794. It consisted, said Brillat-Savarin, of a superb piece of corned beef, a stewed goose, a magnificent leg of mutton, vegetables of every description, and huge mugs of cider at each end of the table. After the meal the farmer addressed his guest as follows:

You behold in me, my dear sir, a happy man, if there is one on earth; everything you see around you, and what you have seen at my house, is produced on my farm. These stockings have been knitted by my daughters; my shoes and my clothes come from my herds; they, with my garden and my farmyard, supply me with plain and substantial food. The greatest praise of our government is that in Connecticut there are thousands of farmers quite as content as myself, and whose doors, like mine, are never locked.

Taxes here scarcely amount to anything, and, as long as they are paid, we can sleep calmly. Congress favours in every possible way our rising industry; agents from every quarter are always ready to rid us of all that we have to sell; and I have ready-money in hand for a long time, having just sold at twenty-four dollars the barrel of flour for which I usually get eight.

All this is due to the liberty we have won by arms and established in good laws. I am master of my own house, and you will not be astonished to know that the sound of the drum is never heard there, and that, unless on the 4th of July, the glorious anniversary of our independence, we never see either soldiers, or uniforms, or bayonets.

A man so fortunate as to live thus would feel little urgent need to call upon his government for aid. What happened, then, to make such farmers lose their stark individualism and their passionate self-sufficiency? Within 50 years after this farmer spoke, agriculture had subtly changed. New post roads, canals, and railroads now greatly facilitated commercial farming. Whereas agriculture had been a way of life for the farmer of 1794, it increasingly became an occupation for his successors.

Naturally the subsistence farmer needed little governmental help. He was his own secretary of agriculture. As farming slowly became a competitive commercial enterprise, things changed rapidly, and a tendency grew to look to the State and Federal Governments for assistance in meeting problems with which the commercial farmer could no longer cope individually. This aid differed materially from that extended by a mother country to her colonies.

Even in colonial times, however, Benjamin Franklin, when agent for Pennsylvania in Europe in 1770, sent back seeds and plants to be distributed in the American Colonies. When an independent nation was established here, agriculture naturally assumed new and different characteristics.

ORGANIZATION AND STUDY START CHANGES

One of the first signs of the change in American agriculture was the establishment of agricultural and scientific societies by the so-called "gentlemen farmers." The Philadelphia Society for the Promotion of Agriculture was founded in 1785, and George Washington was elected an honorary member on July 4 that year. Washington consistently manifested great interest in agriculture and was often affectionately called "The Farmer of Mt. Vernon" in the earlier years of the Nation's history. In 1785 also the Society for the Promotion of Agriculture was incorporated in South Carolina. Six years later the New York Society for the Promotion of Agriculture, Arts, and Manufactures was organized, giving equal status to each of the three, and on March 7, 1792 the Massachusetts Society for the Promotion of Agriculture was formed. Other agricultural societies appeared rapidly thereafter in every part of the country.

In 1790 the settled area of the country extended westward an average of about 255 miles, and 90 percent of all persons gainfully employed were engaged in agriculture. At this time many industrial functions later taken over by factories formed a regular part of the farm economy. In 1793, Eli Whitney invented the cotton gin, and Thomas Jefferson was experimenting with moldboard plows.

Meanwhile in Great Britain Sir John Sinclair (1754-1835), the great Scottish writer, financier, and agriculturalist was active. He was not a mere theorist but did much practical work of value as well. In 1793 he was instrumental in forming the British Board of Agriculture and became its first president. George Washington corresponded regularly with Sir John and, in a letter written in 1794, expressed the hope that a similar national agricultural society would be formed in the United States, as Sir John had suggested.

But Washington, who was an honorary member of the British Board, went on: "It will be sometime I fear, before an Agricultural Society with Congressional aids will be established in this country; -we must walk as other countries have done before we can run, Smaller Societies must prepare the way for greater, but with the light before us, I hope we shall not be so slow in maturation as older nations have been." Nevertheless, Washington determined to bring the matter to public attention in the United States, and we find the following statement in his last message to Congress, December 7, 1796:

It will not be doubted that with reference either to individual or national welfare agriculture is of primary importance. In proportion as nations advance in population and other circumstances of maturity this truth becomes more apparent, and renders the cultivation of the soil more and more an object of public patronage. Institutions for promoting it grow up, supported by the public purse; and to what object can it be dedicated with greater propriety? Among the means which have been employed to this end none have been attended with greater success than the establishment of boards (composed of proper characters) charged with collecting and diffusing information, and enabled by premiums and small pecuniary aids to encourage and assist a spirit of discovery and improvement. This species of establishment contributes doubly to the increase of improvement by stimulating to enterprise and experiment, and by drawing to a common center the results everywhere of individual skill and observation, and spreading them thence over the whole nation.

The suggestions made by Washington were favorably received by his Secretary of State and public men generally. The Senate officially responded: "The necessity of accelerating the establishment of certain useful manufactures by the intervention of legislative aid and protection and the encouragement due to agriculture by the creation of boards (composed of intelligent individuals) to patronize this primary pursuit of society are subjects which will readily engage our most serious attention."

So a committee of the House of Representatives recommended on January 11, 1797, that an agricultural board or society be created, that high Government officials be members ex officio, and that it meet annually. The measure never came to a vote. In any case, the Nation generally prospered in the long period of peace following the War of 1812, and its population increased and rapidly extended westward. Means of transportation and communication improved, Fulton demonstrating the practicability of his steamboat in 1807.

In 1819 the Secretary of the Treasury directed consuls to collect seeds, plants, and agricultural inventions for introduction into this country, although there was no appropriation for the purpose. William Eaton, consul at Tunis during Washington's administration, had sent several Barbary sheep to Timothy Pickering, Secretary of State, for introduction here. The Secretary presented a pair of these sheep to the Philadelphia Agricultural Society whence the breed spread. In 1810, William Jarvis, consul at Lisbon, took advantage of the Napoleonic wars to secure thousands of Merino sheep for this country. During the administration of John Quincy Adams as President directions were given to all United States consuls to forward rare plants and seeds to Washington for distribution. As a result the Botanical Garden was established in the Capital.

The agricultural societies were a chief means by which improvements were brought to the notice of farmers. In 1852 there were 300 active agricultural organizations, and by 1860 they numbered over a thousand. Closely related to the spread of these societies was the rise of agricultural fairs and journals.

In 1804, Dr. Thornton, described as "the first commissioner of patents resident in Washington—a city in the woods," suggested that an agricultural fair be held. This was duly held April 26, 1805 on "the mall at the south side of the Tiber, extending from the bridge at the Centre Market to the Potomac." Awards were given for exceptional entries, and the fair was declared a great success.

Two years later Elkanah Watson exhibited Merino sheep in Pittsfield, Mass. In 1810, the Columbian Agricultural Society for the Promotion of Rural and Domestic Economy held an agricultural exhibition in Washington. Prizes of \$100, \$80, and \$60 were awarded for "two-toothed ram lambs" and other entries. President Madison attended in his "inauguration suit, the coat made from the merino wool of Colonel Humphreys' flock, and the waistcoat and small-clothes made from the wool of the Livingston flock at Clermont."

Elkanah Watson held his first real agricultural fair in Pittsfield on October 10, 1810, with 26 farmers participating. He then organized the Berkshire Agricultural Society to hold annual fairs, and thereafter fairs rapidly became institutionalized.

AN AGRICULTURAL PRESS APPEARS

The *Agricultural Museum*, believed to be the first farm journal in the country, was published in Georgetown, D. C., from 1810 to 1812 as the organ of the Columbian Society. Far more significant in its influence, however, was the *American Farmer* established at Baltimore in 1819 by John Skinner. Farm journals multiplied thereafter, appearing in every State, and all urged farmers to take up new and better methods of husbandry.

CONGRESSIONAL COMMITTEES ON AGRICULTURE CREATED

Congress also became aware of agriculture in this period, the House establishing a Committee on Agriculture in 1820 and the Senate one in 1825. In addition Congress in 1828 authorized the publication of a manual, prepared by Richard Rush, Secretary of the Treasury, and containing the best available information on the growth and manufacture of silk. In 1828 Count Von Hazzi's *A Treatise on the Rearing of Silk-Worms* was printed as a Congressional document. Several other official reports on the silk industry were published around this time, there being a fixed idea that silk culture could be established in this country.

This also was the period of manual-labor schools based on the educational system of Fellenberg, in Hofwyl, Switzerland. Students sought to make the schools financially self-sufficient by working in workshops and on farms. Popular and agricultural education thus became an important rural issue, and agricultural spokesmen began to demand formal recognition by the Government.

Our early farmers had about the same equipment possessed by Abraham and Lot when they moved into Ur of the Chaldees - the wheel, the lever, and cutting tools - fortified by a few things that Abraham did not have such as powder, firearms, and books. They worked along with their wood-toothed harrows, iron-pointed wooden plows, hoes, spades, sickles, flails, and little else. They felt that they needed neither elaborate tools nor scientific aid, contemptuously termed "book farming," and the more daring of them moved continuously on to the rich lands of the ever-progressing frontier when their old lands wore out.

Gradually, however, those who remained settled at the eastern rim of the country began to think in different terms. They began to feel the need for governmental aid. Meanwhile Congress had already sought to subsidize silk growing and had financed some work on sugarcane. The Patent Office was increasing its distribution of plants and seeds of foreign origin, at first without legislative warrant.

TECHNOLOGY SPEEDS UP

The development of the reaper, the steel plow, the threshing machine, and other implements around this time eventually produced great changes in agricultural technology and in the general economic and social organization as well. For example, the Colt revolver, patented in 1836, was an important factor in clearing the Great Plains of hostile Indians and making possible the more rapid settlement of the region. To produce farm implements specialized factories requiring considerable capital were now necessary. The farmer's investment in these machines made it essential for him to seek more funds, and thus his dependence on the commercial market increased.

SNAPSHOTS OF AGRICULTURE IN 1839

Let us now briefly survey the condition of agriculture in 1839 when Congress authorized its first appropriation for agricultural purposes. In that year the District of Columbia produced more rye than "Wiskonsin," more hay than Mississippi, more tobacco than South Carolina and "Wiskonsin" combined, and the value of its orchard and market-garden produce was three times that of Florida. In 1839 one-third of the national income was from agriculture as against one-eighth in recent years, and whereas four-fifths of our gainfully employed workers were then in agriculture, today almost that proportion is in nonagricultural pursuits.

JUST BEGINNING IN THE WEST

There was practically no agriculture west of the Mississippi, except in Louisiana and Missouri. Michigan and Arkansas had but recently become States. Iowa, Wisconsin, and Florida were still Territories, Texas was an independent republic, and Captain John Sutter under a Mexican land grant was beginning to set up his little empire and to develop agriculture along the Sacramento River.

Nevertheless farmers were pouring into the Middle West from the East as well as from Europe, settling in wooded regions because the forests afforded fuel, game, building materials, and protection from tornadoes, and along rivers because they afforded transportation. The farming was largely of a pioneer type, that is land was cheap and plentiful, labor and capital were scarce. Soon, though, considerable quantities of wheat and flour, and some corn, lard, butter, cheese, and wool were being shipped to the East along the Erie Canal. Cheap western land thus began to compete with eastern agriculture.

OUTGROWING SELF-SUFFICIENCY

New Orleans had already become a great agricultural trans-shipping market. New England was trying to adjust to a new form of specialized yet diversified agriculture set up to supply nearby urban markets. It could no longer hold to the one-crop system—hogs, hops, wool, broomcorn, or beef—but began to market milk and produce fruit and vegetables. The transition from a self-sufficient to commercial agriculture was slow and painful. Some New England States even tried to repeal economic laws and arrest progress by paying bounties for the production of the old crops raised in competition with cheaper products from the West.

The making of textiles had already been largely transferred from the homes to the factories, and some repined that farm wives would now have nothing to do but luxuriate in laziness. The decline of household industry was beginning to have its effects on the ideals of self-sufficiency and on the farm family as a social and economic unit.

THE SOUTH HAD ITS PROBLEMS

A century ago the South produced almost all the cotton, rice, sugar, and sweetpotatoes, and most of the tobacco, hemp, and corn. Cotton, rice, and tobacco were usually grown by the one-crop system, cotton growing having undergone tremendous expansion during the speculative 1830's, before the deep depression current in 1839 was under way.

Farmers in Maryland, Virginia, and North Carolina were already faced with soil exhaustion and erosion, low prices for farm products, high prices for slaves and equipment, and a sharp deflation in land values. Mass migration to the West was under way, suggesting the similar migration of impoverished agricultural workers in recent years, only the farmers of a century ago had rich new lands to settle upon at their journey's end.

When the land eroded the farmer simply left and went elsewhere. Scientific, aristocratic farmers in colonial days made efforts to stop gulleys and remedy soil depletion, but this was regarded as a job for farmers to attack individually. The broad social aspects of soil conservation as a national public service and the consciousness of our interest as a people in the preservation of the public domain awaited the future.

DEPRESSION CAME

The depression of 1837-42 was the most extended period of severe misfortune the Nation underwent before the Civil War. In 1839 alone 759 banks closed their doors, interest rates rose sometimes as high as 30 percent, and speculative manias abounded. Mulberry trees and silkworm production, broomcorn, the Chinese tree corn, Rohan potatoes, Merino sheep, Shorthorn cattle, Berkshire hogs, even camels and ostriches it was thought would magically solve all agricultural problems.

FROM CANALS TO RAILROADS

The year 1839 also marked the end of the canal era and the beginning of the railroad-construction period. Already a network of post roads connected the principal cities. Better means of transportation coupled with the refrigeration methods later to be developed greatly expanded the market for agricultural products.

TECHNOLOGY BEGINS ITS MARCH

John Deere of Illinois, who produced his first steel plow from a saw blade in 1837, touched off the revolution in which machinery took the place of manpower in agriculture. Already in 1831 William Manning had patented his mowing machine, and Obed Hussey and Cyrus McCormick made the reaper practicable between 1833 and 1844. The stationary thresher and fanning mill, introduced in the thirties, reduced the time required for threshing, winnowing, gathering, and sacking an acre of wheat from 26 hours in 1839 to 4 hours in 1840. About 50 to 60 man-hours of labor had been required to produce 20 bushels of wheat with a walking plow, a bundle of brush for a harrow, hand broadcasting of seed, harvesting by sickle, and threshing by flail.

Hence the factors greatly influencing agriculture in 1839 were, in brief: An acute and general depression; improvements in means of transportation and communication; a mass migration of farmers to the West; and advances in agricultural science and technology.¹

In 1840 there appeared that tremendously important and influential work on *Chemistry in its Application to Agriculture and Physiology* by Justus von Liebig. That opened the eyes of the scientific, aristocratic farmer to what chemistry could do for agriculture.

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¹For further details, see the article by Arthur G. Peterson, "Agriculture in the United States, 1839 and 1939," *Journal of Farm Economics* 22: 98-110 (February 1940).

SNAPSHOTS OF EVENTS SINCE 1839

FOREIGN CONDITIONS REGISTER EFFECTS

A few years later the repeal of the British Corn Laws were to exercise a marked effect on our agriculture. For many years Great Britain had sought to protect its own agriculturalists by placing high import duties upon all bread-making grains. The laws imposing these duties were called the Corn Laws. They ultimately worked much to the disadvantage of the people at large. In 1845 the Irish potato crop, upon which the people of Ireland depended for food, failed totally. A terrible famine followed which focused attention upon the obnoxious Corn Laws. In 1846 they were in part repealed, the repeal becoming complete in 1849. Thereafter it became possible for Great Britain freely to import American food grains. The Irish famine and the German revolution of 1848 brought to the United States a tremendous influx of immigrants.

At the instance of Patent Commissioner Henry L. Ellsworth, President Van Buren, in recommending that Congress widen the scope of the Sixth Census, induced that body on March 3, 1839 to permit the Patent Office to expend \$1,000 for the collection of agricultural statistics and for other agricultural purposes. It was natural in these early days that such work gravitate toward the Patent Office, for it was concerned with experimentation and the stimulation of enterprise and invention, and therefore with scientific progress in agriculture.

GOVERNMENTAL AID TO AGRICULTURE UNDER WAY

Governmental aid to agriculture was at last under way. A long history started. The aid would progress from the increase to the regulation of production; from subsistence to commercial agriculture; from self-reliance to considerable dependence on guidance by the Government; from the exploitation to the conservation of natural resources; from traditional guesswork to the application of verifiable scientific knowledge; from uncoordinated individual activity to well-coordinated group action through governmental aid, using the democratic process.

In order to trace the evolution of the Federal Government's contribution to agriculture let us examine the annual reports of those who were successively in charge of this work in Washington. Although some attention will be given to the frame of reference within which the Department of Agriculture expanded and operated, the main effort here will be to trace the growth of the Department itself as an institution.

Throughout there should be kept in mind the factors that made the Department of Agriculture what it gradually became. In frequent instances the types of service instituted came into being because various groups insistently demanded something of the kind. Their influence was sometimes felt directly, as when they appealed to Congress. At other times the appeal was made indirectly through departmental officials.

Pesides pressure groups and civil servants, there were from time to time notable individuals, typified by John Muir, whose civic interests and foresight, led them to become aware of an emerging public problem and to exert their influence before the people as a whole understood. Finally we must mention the influence of political leaders in Congress, the Presidency, or the Cabinet—men like Senator Morrill and Representative Lever; Presidents Lincoln, Wilson, and the two Roosevelts; and Secretaries of Agriculture Wilson, Houston, and the two Wallaces. Such individuals evaluated and appraised ideas and pressures and promoted policies and legislation that best served the public interest in times of rapid change.

Every successive new function undertaken by the Department of Agriculture will be found outlined in an act of Congress. Hence the expression "The Department of Agriculture did so and so" should generally be interpreted as an abbreviated way of saying, "The Department of Agriculture, responding to public demand through the execution of work directed by an appropriate act of Congress authorizing this activity, did so and so."

STATISTICS INCREASE IN IMPORTANCE

Naturally the earliest demands concerned the promulgation of agricultural statistics as a guide to planting and marketing and as an aid in lowering the unit costs of production. The more intelligent farmers saw that the application of chemistry, statistics, entomology, and veterinary medicine to the solution of production problems would increase the margin between costs of production and selling price.

Farmers wanted to grow more crops with less labor. They sought to raise plants and animals that would stand up well under adverse conditions and thus tend to stabilize their incomes. When in 1890 the frontier was essentially closed, and most good public land was no longer available for free distribution, the problem became more acute than ever. Land boom and population growth masked the economic effects of our gradual loss of foreign markets after 1898 and produced a rising price level for agricultural commodities in spite of diminishing agricultural exports.

SOCIAL AND ECONOMIC QUESTIONS ATTACKED

At the turn of the century another group of problems appeared. They concerned social and economic questions and were associated with our decreasing farm exports and the ever-increasing use of agricultural technology. The farmer now needed assistance in his credit and marketing problems as well as in the formation and management of cooperatives. He required adult education in agricultural science which was provided by demonstration farms and later by the Extension Service.

Many activities that began tentatively in Secretary Wilson's term of office fructified into large-scale functions under Secretary Houston. These concerned land use, marketing, the regulation of trading and exchanges, and the adjustment of agriculture to industry and to rapidly changing world conditions. Whereas previously the Department had tended to be a collection of research workers and informational attaches, now a centralizing tendency towards integration began.

WORLD WAR HASTENS CHANGES

The World War was a period of accelerated exports to Europe, speculative land values, greatly increased acreage in cultivation, and expanded use of agricultural technology, with a great decrease in the number of horses and mules on farms. Thus millions of acres that had never been cultivated before were plowed up, while millions of other acres formerly used to pasture and grow feed for work animals became available for beef and dairy-herd production.

This period of tremendous, but specious and largely synthetic, agricultural expansion coincided with our transition in status from a debtor to a creditor nation. Our country sustained the debauch for some time by loaning Europe billions of dollars-loans that later turned out to be gifts. At the same time we pushed our own tariff walls ever higher, which effectively prevented foreign nations from repaying our loans in the only possible way, by shipping goods to us.

Our tight-rope balancing act could not last indefinitely. It was impossible for us to attain the advantages of being both a debtor and a creditor nation. Thus it was that during the roaring twenties we prepared for the disasters that crashed down upon us in the thirties. For our European market promptly collapsed when our loans ceased.

PROBLEMS EXCEED INDIVIDUAL CAPACITIES

Meanwhile long-time disasters contingent upon our waste and exploitation of natural resources - water, soil, and forest - likewise fell heavily upon us. Farmers tried their best to solve the problems that confronted them, but it soon proved entirely beyond their capacity with the means at their disposal. They therefore invoked the new agencies that arose so rapidly from 1933 on to aid agriculture. It was the farmers in the last analysis who compelled Congress to enact the laws that brought these agencies into existence.

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RETURN TO EARLIER CENTURY

With this cursory general outline in mind we now turn back to January 1, 1838. Commissioner Ellsworth was making his first printed Annual Report as Patent Commissioner.² He addressed it to James K. Polk who was then Speaker of the House of Representatives. Ellsworth expressed regret at the recent loss by fire of the materials and valuable papers deposited in his office by Robert Fulton and others and of the many valuable plans and models that were burned.

On July 4, 1836 when the Patent Office had become a separate bureau of the Government, it occupied some upper rooms in Blodgett's Hotel, a three-story building on E Street. In December of, 1836 this building burned to the ground and all the patent records along with it. Only in 1840 did the Patent Office get its new building on F Street, now occupied by the headquarters of the Civil Service Commission.

Ellsworth continued that of late inventors "have directed their attention, with peculiar interest, to the improvement of the implements of *agriculture*, and many labor saving machines have been patented, which are of the highest utility to the husbandman. These are rapidly increasing; and it is scarcely possible to conjecture to what extent the labor of the agriculturist may be diminished, and the products of the country increased, by these improvements."

Horsepower, he went on, was already being used for sowing, mowing, and reaping, and "inventors are sanguine in the belief (and probably not without reason) that the time is not far distant when ploughing machines will be driven by steam, and steam-power applied to many other operations of the husbandman." Elsewhere he added: "A subject intimately connected with this, is the aid which husbandry might derive from the establishment of a regular system for the selection and distribution of grain and seeds of the choicest varieties for agricultural purposes."

DISTRIBUTION OF SEEDS AND PLANTS BRINGS RETURNS

During 1836 and 1837 Ellsworth, at his own expense and without Congressional authorization, had distributed seeds and plants that were transmitted to him gratuitously for the purpose. Soon the function of seed distribution was to be regularized under Congressional authority. For a long time it consumed most of the Federal funds allocated to agriculture. Ultimately it became little better than a disgrace, as certain heads of the Department declared. Congressional seed distribution was not ended finally until June 30, 1923.

²The term "report" is applied in two connections. It is used in the title of the annual account of activities submitted by the head of the Patent Office, by the Commissioner or Secretary of Agriculture, and by their subordinate officials. It also appears in the title of the publication which contains the separate reports together with other materials, such as articles, correspondence, and tables. In this paper *Report*, written in arabic, indicates the official statement itself, and *Report*, written in italics, indicates the entire volume.

The Commissioner went on: "Husbandry seems to be viewed as a natural blessing, that needs no aid from legislation," though he observed that manufactures and commerce received plenty of governmental help. He thought that this tendency of officials to regard the products of the soil as pure bounties of Providence was unwise. On the other hand, the Patent Office was always crowded with people who brought models of machines for improving agriculture and who were

eager to communicate a knowledge of every kind of improvement in agriculture, and especially new and valuable varieties of seeds and plants. Hence, the undersigned has been led to receive and distribute, during the last two years, many articles of this kind which have been committed to his care; and experience has induced him to believe that there is no spot in the Union so favorable to this object as the seat of Government.

Hence, reasoned Ellsworth, some place in Washington should be designated as a repository for plants and seeds as well as for agricultural information. For he felt that persons who traveled would delight in bringing back valuable plants and seeds. He then spoke of a new wheat variety, already introduced, which promised to resist the destructive effects of severe winters. He added that "the most eastern State of our Union" had long been compelled to depend on other States for breadstuffs but had not had to do this since the introduction of the new cold-resistant wheat; indeed it would soon have a surplus to sell.

Ellsworth felt there was great room for expanding this kind of thing by selection among wheat varieties, some of which yielded as much as 20 percent more than others. He made reference to experiments carried on during the past summer which had indicated that the Indian corn crop could be improved in yield one-third without any extra labor, simply by due regard for seed selection. One unnamed individual, who had already devoted 25 years to this project, had produced an excellent corn variety that should be transmitted widely.

The Commissioner also gave figures on our consumption of flour at that time and showed from them that a 10-percent increase in the yield of wheat would provide the Nation with an additional income of from 15 to 20 millions of dollars a year. He repeated this calculation in later reports. He said that if this increased-crop-yield idea were generally applied in the vegetable kingdom agricultural progress would be bound to take place rapidly. Finally he expressed the thought that the central Government should take all sciences under its wing.

REPORT SHOWS CHANGING STATUS OF WORK

In his Report for 1838 Commissioner Ellsworth devoted himself in the main to a discussion of Patent Office affairs. The building his unit now occupied was too small, and he had too few employees to do the work properly. The law made provision for only two examining clerks and these were overworked, and he wanted two assistant examiners appointed as soon as possible.

Ellsworth's account for 1839 occupied but two printed pages. Herein he remarked that: "The ordinary expenses of the Patent Office the past year, including payments for the library and agricultural statistics, were \$20,799.95." An examination of the financial statement reveals that the sum of \$126.40 had been expended for

agricultural statistics and seeds, but that there was a net balance to the credit of the patent fund of \$11,450.03. Hence the Patent Office was self-supporting, and it also now had legal authority to use some of its incoming fees for agricultural purposes.

That \$126.40 represented part of the \$1,000 granted by Congress in 1839, for no such huge sum as \$1,000 was as yet spent in any one year for agricultural purposes. Also appearing in this Report was Ellsworth's letter of January 22, 1839 to Chairman Fletcher of the House Committee on Patents in response to the latter's inquiries about the agricultural work. The letter, it should be noted, preceded the voting of the appropriation.

Herein the Commissioner said he simply could not fail to notice agriculture, and that he had sought to promote it as best he could without neglect of his other duties. Numerous letters came to him telling how seed distribution had aided the corn crop. He spoke also rather daintily of "the sexuality of plants, and the practicability of crossing the same."

He went on to say that planters in the Mississippi region thought the new 'Baden corn' would increase their crop yield by 50 percent. Certain Italian and Siberian wheats, introduced by the Patent Office, were also doing nicely. Arrangements really should be made for the permanent and regular exposition and distribution of such varieties. We exported 80 million dollars' worth of agricultural products a year and our domestic consumption was still greater. A 10-percent increase in agricultural crop yields, through seed selection, would therefore mean an addition to the national income of more than 20 million dollars a year.

So the Commissioner said he was very glad that the Representative had asked him about agricultural statistics. They should be collected by all means. They were very valuable to farmers. For instance, recent fears for the maize crop had led timorous and cautious growers to make advanced sales at poor prices. Only speculative monopolists had profited, which was bad business. The Commissioner of Patents would cheerfully, if desired, collect agricultural statistics from all over the United States and put them in his annual reports for the guidance of growers.

Furthermore, a new era of labor-saving machinery was just dawning. Flax was being prepared for spinning on common cotton machines. Sugar was being extracted from beets by a method recently discovered. The culture and manufacture of silk in the United States would save us from having to import 20 million dollars' worth a year of this product. Everything conspired to make this dawning epoch a bright one.

We really needed to have a place where plants and seeds collected abroad could be sent for distribution. The Navy was unfortunately delivering them to ports whence they could not be shipped to those in need of them. Why not let the Patent Office be the agency for their collection and distribution?

Obviously this letter had much to do with the Congressional grant of \$1,000 for agricultural purposes. Faith in the aid science could give agriculture sprang in part from Liebig's book mentioned above. The much earlier publication in 1813, of Sir Humphry Davy's *Elements of Agricultural Chemistry*, which developed out of a course of lectures Davy was commissioned by the British Board of Agriculture to give in 1803, was also important

Commissioner Ellsworth used two and a half pages to describe his activities for 1840. He mentioned the new building provided for the Patent Office and hoped soon to move into it. He spoke of the small appropriation made in 1839 for agricultural statistics and other such purposes and said that 30,000 packages of free seed had been distributed. Those who got the seed expressed themselves as much gratified. He expected soon some seed collected in many remote parts. He had expended \$451.58 for agricultural purposes, and his report was addressed to R. M. Johnson, "President of the Senate."

Congress exhausted itself for the time by its 1839 appropriation, and no grant was made for agricultural purposes in 1840 or in 1841. In 1842 another \$1,000 was made available and this sum was doubled in both 1843 and 1844. It rose to \$3,000 in 1845, but nothing was granted in 1846 and agricultural work was interrupted. There were no lapses thereafter, however.

The appropriation was \$3,000 in 1847 and \$3,500 in 1848 and in 1849. The appropriation rose to \$4,500 in 1850, was \$5,500 in 1851, reverted to \$5,000 in 1852 and 1853, and then in 1854 suddenly jumped to \$35,000. It dropped back to \$25,000 in 1855 but was \$105,000 in 1856. It decreased to \$63,500 in 1857 and in 1858 dropped to \$60,000. By that time agriculture definitely amounted to something as a governmental activity.

The Commissioner's Report for 1841, dated January 1842, covered five pages, and in it he remarked that there was "extreme pressure in the money market." He complained rather tartly that he had not been able to occupy his new building because much of it had been given over to a National Institute provided by a Mr. Smithson - the beginning of the Smithsonian Institution. He felt it was well to aid a worthy cause but he said that he did urgently need his building. He repeated his prediction about increased farm income to be derived from improved crop yields.

The introduction of foreign seeds went on apace. "The value of the agricultural products almost exceeds belief," wrote the Commissioner. "If the application of the sciences be yet further made to husbandry, what vast improvements may be anticipated!" This led to a eulogy of agricultural chemistry, an indication perhaps that Ellsworth had read Liebig's book. For he said chemistry was of supreme importance to prevent farmers from groping along as they then did. It would prove what croplands would bear to advantage and what soils and manures were best.

VALUE OF EXPERIMENTATION RECOGNIZED

Had not chemistry already aided the West to find exports of value in oil? Had it not shown how to convert pork fat into stearine for candles, thus providing a substitute for spermaceti? It had also demonstrated how 10 gallons of oil could be derived from a 100 bushels of corn meal. The value of this discovery was indicated by the fact that one company was trying to secure the privilege of supplying all the lighthouses on "the upper lakes with this article."

If meal and pork could thus supply oil for burning and for use on machines, what next? There was also a new way of trebling the saccharine content of cornstalks so that 1,000 pounds of sugar could be made per acre of corn. Delaware experiments

with this method had been entirely successful. One simply permitted the stalk to mature, removing the ears before they were well formed, and the stalk sugar was thus increased to three times that contained by beets. German chemists were already at work on this method. We should get busy because cornstalks offered a source of sugar equal to sugarcane itself. Incidentally, experiments continued on this project for many years before it was finally abandoned.

Ellsworth also announced that a national agricultural society had been formed, which denoted progress. The country still imported too much however; it should not only raise enough to supply its own needs but also export enough to prevent the annual starvation of 20,000 people in Great Britain. The United States could raise the wheat and give the British their bread. Moreover a new packet line had just started to Bremen, so perhaps we could also export to the Germans.

The sum of \$125 had been spent for the distribution of seeds and the compilation of agricultural statistics. It was very advantageous to publish promptly the quantities of various crops produced. For instance, when Indian corn could be purchased for \$1 per barrel of 196 pounds on western waters, and transportation to New York via New Orleans did not exceed \$1.50 a barrel, the price of meal need never be higher than 80¢ to \$1 the bushel in the East. People should be acquainted with such facts; efforts to diffuse agricultural statistics would thus promote the public welfare.

Various crops were thereafter discussed at some length in the volume, and yield estimates were given under the heading "Remarks on Agricultural Statistics." The Commissioner's statement for 1842 was brief, but agricultural statistics covered more pages than ever, though only \$105.75 was charged up against them. Statistics apparently came cheap in those days. There were later indications that they were no more than worth the price either. Ellsworth still expressed a desire for more scientific books, and he declared that the country really valued the agricultural statistics supplied in his *Reports*.

The Commissioner felt that there should be an agricultural bureau to put the work on a more permanent basis. More funds were needed, but much benefit would accrue to the population from their expenditure. More data should be secured on crops, agricultural instruments, and improved cultural methods; even quite small appropriations for such purposes would save the public millions annually. After having visited 10 States to examine crops during the past year, Ellsworth said he was sure the people would heartily approve such an expenditure.

In the 1842 volume we also find articles on experiments in making cornstalk sugar, foreign markets, improvements in fencing land and farm housing, the effect of railroads upon commerce and agriculture, our exports and imports, and the British tariff and Corn Laws. There were printed, in addition, numerous letters from various unpaid correspondents conveying agricultural information—a custom long followed thereafter in the *Reports*.

On January 31, 1844 Commissioner Ellsworth submitted his annual account for 1843. Therein he stepped his estimate of increased farm income to be derived from a 10-percent increase in crop yields up to 30 million dollars a year. He also spoke enthusiastically of the telegraph which had recently received its first public use.

He went on also about the marvelous medicinal applications of magnetic batteries and the "electro-magnetic fluid" which, he said, gilded metals, separated beautiful ores, and painlessly dissolved a stone in the bladder. An experiment had recently been made in Paris of illuminating the streets "by means of the electric spark."

The entire volume now ran 330 pages or more. It contained extensive discussions of the various crops, agricultural statistics in abundance, and informative letters from correspondents. There was a general feeling at the time that the diligent collection of statistics would ultimately reveal natural laws in operation and thereafter progress would be made rapidly by obedience to them. Only \$444.67 was reported spent for agricultural purposes.

Commissioner Ellsworth's *Reports* are of especial interest both because of his lively intelligence and of his urgent desire to aid agriculturalists. His last one, dated January 28, 1845 (he relinquished office on April 30 of that year), covered activities during 1844 and comprised a book of 520 pages with index. The Commissioner began by citing the low rates of pay in his office.

ENTER ELECTRICITY

The Commissioner also mentioned the "electric fluid" again which was now achieving all sorts of things since it had been "confined and tamed." It annihilated distance. "Thought has found a competitor." Paper *H* in the book detailed how Professor Page had telegraphed 40 miles. Elsewhere was published a letter from Professor Morse to the Secretary of the Treasury reporting upon the telegraphic transmission of the proceedings at the Democratic National Convention in Baltimore during May 1844. Morse also suggested that the Government take over this new medium of communication and operate it as it did the postal service.

AGRICULTURE NOW A MAJOR STUDY

The science of agriculture had now become a major study in the Patent Office. Abandoned and worn-out lands were being reclaimed. Guesswork and hereditary notions were yielding to scientific analysis and the application of scientific principles. Science however must always be perseverant. Some scientists had at first claimed that cornstalk sugar was grape sugar, whereas additional tests had proved it to be "equal to the best muscovado sugar." Ellsworth felt sure that good sugar would soon be produced by this method on a large scale. It never was.

Several grains had been analyzed. Dyspeptics would soon learn from such analyses that certain meals were difficult to digest because they contained excessive oil. New methods of farm fencing and of building farmhouses of unburnt brick were discussed. It was stated that the earth's productivity could only be improved by better manure, tillage, drainage, subsoiling aids, and deep plowing - for roots went much farther down than most people thought.

Twenty or thirty thousand packages of seed had been distributed. The Navy could often pick up seeds for nothing in foreign ports, but an appropriation should

be available to package, box, and ship them from the American ports where they were put ashore. "To meet the emergency, it is suggested that the annual appropriation made for agricultural statistics and other purposes should be increased \$1,000." This request was granted by the Congress.

Potato diseases were causing much anxiety all over the land and they were being investigated. The Hessian fly and other insects destructive to wheat were raising hob and should be controlled. In good time science did control the fly, too. The husbandman, said Ellsworth, may get momentarily depressed by the low prices of crops, "but he is cheered by the reflection that he is far better off than those in professions proverbially crowded." At least he raises enough to eat.

"How much better for the young man of this country to aspire to the enviable rank of a scientific and successful agriculturist, than to grasp at the shadowy honors that are momentarily cast around the brows of political combatants." Here Ellsworth writes like a defeated candidate for office. Perhaps he wanted to cheer up the husbandman who, he added, should also be consoled because the rapid introduction of labor-saving machinery was reducing the cost of the necessities of life he had to purchase.

"Mowing and reaping will, it is believed, soon be chiefly performed on smooth land by horse power. Some have regretted that modern improvements make so important changes of employment—but the march of the arts and sciences is onward, and the greatest happiness of the greatest number is the motto of the patriot." How thoroughly modern is this reference to relationships between agriculture, industry, and technological unemployment.

"There is, however, a dark cloud which lowers over the Republic," continued the Commissioner. "The incubus *debt* had lost its terrors, and obligation carries with it little self-reproach. Past experience is disregarded." It is unfortunate that imports increase at this time when the value of agricultural products is low. "Has not the time arrived for the South and the North to commence retrenchment and practise more rigid economy? The wheel of fortune will not turn out prizes, nor can patents be granted for paying debts."

The book contained much additional discussion, as well as ample quotations from journals and newspapers, and letters from correspondents regarding the Hessian fly, the potato diseases, and the various crops. The comments of two correspondents who discussed cotton bear brief examination. One wrote of the necessity for aid "in disposing of the surplus of our crops for several years to come."

The other said: "...we fully agreed that its [cotton's] over-production was the principal cause of its present low price; and that, unless some new source for its consumption could be found, the planter had nothing to expect but its continued ruinous depression. The article of cotton, like all other productions of labor, is governed in its price by that general law of commerce, demand and supply."

SURPLUSES RECEIVE ATTENTION

This correspondent next suggested that new uses be found for cotton surpluses. For instance, cotton might be used to stuff mattresses in lieu of hair or moss. The

planters were saying that high prices tended to make large crops but that at current prices they simply could not continue to produce cotton. An expected crop of 2,300,000 bales was anticipated with grave forebodings. If the crop proved that large only an unfavorable season could help cotton growers.

The Mississippi correspondent fervently hoped that some check would be given to cotton production. He did not suggest plowing under, but he did say that if the current crop turned out to be 2,300,000 bales, added to the carry over of 904,000 bales, it would offer a terrible problem. Moreover, if this process were repeated there would be a carry over of 1,300,000 bales in 1846, and by 1847 the cotton carry over alone would be sufficient to supply 2-years' consumption without any being grown. A hundred years later there were two bales of cotton in the world for every one that could be sold during the current marketing year.

A PRESIDENT DECLARES APPROPRIATION INADEQUATE

Edmund Burke became Commissioner of Patents May 4, 1845 and held office till April 30, 1849. During his term the *Report* was greatly expanded and included tables of British and American imports and exports as well as English cotton quotations. In 1846 agricultural statistics were omitted for lack of an appropriation, though in 1847 they reappeared. In 1849 the Patent Office was placed in the new Department of the Interior. President Zachary Taylor in December 1849 recommended the establishment of a Bureau of Agriculture in the new Department. His message declared that governmental assistance to agriculture was totally inadequate. Congress took no action.

Commissioner Burke's volume for 1845 noted the expenditure of \$2392.41 for agricultural purposes and contained over a thousand pages of agricultural matter. As there was no appropriation in 1846 the next *Report* was dated January 1848 and covered 1847. Burke mentioned the interruption to agricultural work because Congress had made no funds available and said that its resumption proved difficult.

Yet agriculture was asserted to be "the great transcendent interest of the Union." The farmer had "equal reason to console himself with the honorable character and exalted dignity of the pursuit in which he is engaged. No occupation offers a greater field for experiment, and for the application of science directed by sound judgment. Experience has proved that every grain, vegetable and fruit, is susceptible of improvement by scientific cultivation."

The Commissioner thereupon told about magic transformations wrought in the potato, the peach, the apple, and other fruits and vegetables by scientific means. He remarked that genius had stooped from its lofty flight to lessen the burden of the farmer's toil, giving him useful implements and valuable machines. The Patent Office should, however, be enlarged and its scientific staff increased.

Reporting in January 1849 for 1848, Burke mentioned a Congressional appropriation of \$1,000 for the institution of a system of analyses of the different grains produced in this country, and of the flour manufactured here for export. This study would show the effects of soil and climate upon the different varieties of grain and of a sea voyage upon the quality of the extracted flours. Professor Lewis C. Beck of New Brunswick, New Jersey, a practical analytical chemist, had been appointed to make

these analyses. Charles L. Fleischmann had also been engaged to study sugar culture in Louisiana.

Beck's report on flour and Fleischmann's on sugarcane were printed in full in this book, which also contained much discussion of agricultural chemistry by various authorities. The sum of \$2,608.17 had been spent for agricultural purposes. Burke admitted that inventors were complaining about the sums spent annually on the agricultural *Report*, but he felt no injustice had been done them. For the collection and distribution of agricultural data not only enhanced the reputation and influence of the Patent Office but also contributed to the quicker application by the people of the various inventions.

Thomas Ewbank (1792-1870), reporting for 1849, addressed himself to President Millard Fillmore. Ewbank served as Patent Commissioner from May 19, 1849 until November 8, 1852. Born in Durham, England, he began as an apprentice in the sheet-metal trade. He came to this country in 1819 and was thereafter an inventor, manufacturer, and author. His primary interest was the industrial application of chemistry and physics.

SCIENTIFIC AGRICULTURE RECOGNIZED

At the direction of the Secretary of the Interior a "practical and scientific agriculturist" was hired to attend agricultural matters in the Patent Office and to prepare the separate agricultural *Report*. Daniel Lee, M.D., was appointed. Ewbank omitted agricultural statistics from the volume because he said those hitherto published had been unreliable, and he therefore declined to "waste time and paper in printing crude guesses." He said that Congress or the State legislators should devise methods of getting good statistics worth printing.

Part II of the *Patent Office Report* concerned with agriculture appeared in 1850 but covered the previous year. Daniel Lee who signed it received a salary of \$2,000 which was reduced to \$1,500 in 1853, when his successor D. J. Browne was employed at that figure. By 1855 Browne also was getting \$2,000. Lee addressed his own statement to Commissioner Ewbank, and it was devoted to "Statistics and Progress of Agriculture in the United States for the year 1849."

Lee's *Report* answered, in condensed form, many incoming letters of inquiry. It also contained numerous "essays" on agricultural subjects and considerable discussion of agricultural education. It told how farmers had begged and begged the State legislatures and Congress for small appropriations to prevent the universal impoverishment of American soils, but in vain.

"Neither the earnest recommendation of the illustrious farmer of Mt. Vernon, nor the prayers of two generations of agriculturalists, nor the painful fact that nearly all tilled lands were becoming less and less productive, could induce any Legislature to foster the study of agriculture as a science."

With some asperity Lee wrote that a grant of a "thousand dollars," judiciously expended, could scarcely be expected to restore fertility to the 100 million acres of partly exhausted land in the United States. The urgency of soil conservation was

apparent. Lee went on to cite the lack of mental culture and discipline among farmers which made it difficult to instruct them. They therefore so misdirected their immense power of production as rapidly to impoverish the soil annually to an extent equal in value to their apparent profits from farming.

There was a special article in the book on the destruction of soil fertility. There were other articles on agricultural subjects of importance, most of them by experts from without the Patent Office. The ravages of insects were said to demand attention. Soils, marls, and fertilizers should be analyzed, and farm animals be improved. Rural science must come into its own, for urban demands made farmers destroy their soil fertility to appease city food requirements.

Part II of the *Report of the Patent Commissioner for 1851* was issued under date of April 23, 1852. It contained numerous articles on such topics as agricultural education, the cultivation of special crops, and cattle breeding, and the usual replies to incoming queries which were printed to inform others as well as the original inquirer.

Lee presumably also prepared this volume. In his previous book he had included some meteorological statistics, the first of their kind to appear in the *Reports*. In the 1851 publication agricultural statistics reappeared, though they were derived from the census. It was also stated that the institution of an agricultural bureau in the central Government had been a source of public discussion for years and was now under active consideration by Congress. Agricultural writers and practical men were urging the project along.

Presidents Taylor and Fillmore, like George Washington, had brought this matter to the attention of Congress. So far, however, the mere employment of a temporary clerk in the Patent Office, whose salary, like the cost of buying and distributing seeds, came out of the patent fund, was all that had been accomplished. Some people objected that agriculture had no greater claim upon Congress than other industries, but the French Republic had established a national agronomic institute in 1848. We ourselves should have an agricultural agency in the Government.

THE WEST EXHIBITS SOME PRIZE PRODUCTS

Well up front in the *Report for 1851* was published what purported to be parts of an address by one "A. Williams, Esq." The occasion was the presentation to a Mr. Horner of a silver goblet for having grown the best varieties of vegetables and grains shown at an exposition in San Francisco. Williams extolled the great natural wealth of California, its gigantic trees and luxurious gardens but deplored the high rents in San Francisco. He then held up a statement signed by 12 worthy citizens of the county of Santa Cruz whom he proceeded to name.

This statement attested that, on land owned and cultivated by James Williams, an onion grew to the enormous weight of 21 pounds and a turnip "was grown which equalled exactly in size the top of a flour barrel." On the land of Thomas Fallen a cabbage grew which measured 13 feet 6 inches around. We read further:

Added to these astonishing productions is a beet, grown by Mr. Isaac Brannan, at San José, weighing sixty-three pounds; carrots, three feet in length, weighing forty pounds. At Stockton a turnip weighed one hundred pounds. In the latter city, at a dinner for twelve persons, of a single potato, larger than the size of an ordinary hat, all partook, leaving at least the half untouched. These may be superlatives, but they do exist, and they show what our soil and climate are capable of producing.

At least this shows that California boosters are not new. Williams continued that such things were no more incredible than the fact that California soil also produced "gold of every conceivable form and size, from dust up to lumps weighing 30 pounds" -or that, in fact, it produced Williams himself almost a century ago. In the exposition before him the speaker said that he saw Shelton's mammoth clover with stalks from one root covering 81 square feet.

He observed also a red sugar beet that was 28 inches in circumference and weighed 47 pounds; a cabbage weighing 56 pounds and 7 feet in circumference; cucumbers 18 inches long; onions that were 5 to 7 inches in diameter and weighed 3 to 4 pounds -yielding 70,000 pounds per acre of an average weight of 1 pound. He saw also before him 10-pound bunches of grapes, 2-pound tomatoes, 50-pound cabbages, and squashes and pumpkins weighing from 100 to 140 pounds. It is too late now to discover whether Commissioner Ewbank had his tongue in his cheek when he permitted the publication of this material or whether all these things actually happened.

CONCERN FOR CONSERVATION AND AGRICULTURAL EDUCATION

Under date of February 28, 1853 Daniel Lee once more wrote on agricultural progress during the year, his main concern still being the conservation of our natural soil resources. He again accused the cities of seducing farmers into sending them their soil riches in the form of foods and breadstuffs. He said that no generation had the right to destroy the soil, a sentiment echoed by Henry A. Wallace and a few other far-sighted men many years afterwards.

Doctors knew that soil pollution and impoverishment were bad and should cease. When Lee, who 3 years earlier took charge of what he called the "agricultural department" of the Patent Office, begged permission to expend \$200 on experiments to find the best ways "to deodorize and concentrate night soil, that it might be put up in bags and sent far out into the country for agricultural purposes" -thus returning to farmers their riches, not a dollar could he get. On the other hand \$100,000 was freely appropriated to publish, bind, and distribute an annual book on agriculture, while our States were shipping away valuable and irreplaceable soil constituents in their crops.

Lee also insisted that we should have agricultural schools to teach our young the principles of soil-building science. He urged Congress to take action. It was about 1849 that Jonathan Turner of Illinois began his campaign for industrial universities. This was part of the long struggle for popular and agricultural education which finally culminated in the passage of the Land-Grant College Act of 1862.

In 1850, it will be remembered, the frontier had reached the Pacific coast following the discovery of gold in California. Free land was becoming a more and more urgent issue; the people believed that Uncle Sam had enough land for all of them to

have some, and they meant to get theirs. Farmers' clubs between 1850 and 1870 kept up incessant agitation. So long as land was plentiful and labor scarce, few would heed Lee's admonitions to maintain the soil.

The 1852 volume contained also a long article on the potato, another on southern agricultural exhaustion, and a prize essay on the agricultural value of phosphate. Silas H. Hodges, who acted as Patent Commissioner from November 8, 1852 to March 25, 1853, apologized for the inferior character of Lee's agricultural *Report* this year. R. C. Weightman was Acting Commissioner from March 25 to May 15, 1853. On the next day Charles Mason became Commissioner, and he held office till August 4, 1857. He made Daniel Jay Browne the editor of agricultural reports and specified that statistics were to be omitted until reliable ones were collected.

Charles Mason (1804-82) was born in New York, attended West Point, and then turned to law and journalism. He became Chief Justice of the Supreme Court of Iowa Territory. After his retirement as Patent Commissioner he was a patent lawyer in Washington, D. C. but subsequently entered politics in Iowa. The *Reports* during his term of office contained fewer letters from correspondents and more learned essays of substantial character by writers like Joseph Henry and other distinguished men.

PROPAGATING GARDEN BEGUN

In 1854 the appropriation for agricultural work became \$35,000. A 2-acre tract between 4½ and 6th Streets and Missouri Avenue was set aside in 1856 for the study of sorghums, and the seed produced was distributed. This marks the origin of the propagating garden. Mason also employed the entomologist Townend Glover, an Englishman, who came to the United States in 1836 and first became interested in orchard work and models of fruits. In 1855 arrangements were made with the Smithsonian Institution to publish meteorological statistics, and the same year a chemist and a botanist were employed, though not on a permanent basis.

In the volume for 1853 great importance was attached to the recent introduction of the soybean. There were many abstracts of correspondence regarding cattle, and the importance of importing camels was discussed for several pages. Gophers, birds, and bees all received notice, as well as Indian corn, bread crops, textile and forage crops, fertilizers, fruits and vegetables, climatology, miscellaneous crops, statistics, and some reports from unpaid correspondents. The subject matter indicates a broadening trend of interest.

The *Report* for 1854 was dated February 6, 1855. In it the following were discussed: Experiments with seeds, domestic animals, insects, fertilizers, bread crops, textile and forage crops, tobacco, sugarcane, sorghum, broomcorn, tomatoes, capers, okra, fruits, nuts, wine, gardening, live fences or hedges, and climatology. This list might be taken as genuinely indicative of the Department's future organization. Mason can honestly be said to have laid down precedents that were followed for many years, some of them still holding. In reporting for 1855, he appealed to the States for official aid in securing reliable agricultural statistics, and printed forms were mailed out to procure them.

Mason's next annual account mentioned an appropriation of \$75,000 which Congress had made for agricultural purposes, and an unexpended balance of \$24,103.88. This money was very largely used for the distribution of seeds. Both entomology and chemical analyses were stressed in the *Report*, and the services of a botanist were mentioned. Fertilizers, livestock, and plant-adaptation problems were discussed.

WHY NOT PROMOTE ARTS OF PEACE TOO?

Then, asked the Commissioner, are agricultural appropriations a departure from Constitutional warrant? While he said that he had no right to discuss this—for his sole duty was to carry out the wishes of Congress—it did seem to him that there was as much warrant in the Constitution for agricultural appropriations as for the establishment of a naval or a military academy. It was as lawful to promote the arts of peace as those of war. They were as useful and quite as germane to the general purposes of our Government.

Indeed millions annually were devoted to the encouragement and security of commerce. Why not do the same for agriculture? Is manufacturing protection more national in scope than aid to agriculture? Congress manipulated the tariff for manufacturers. Why leave farmers to their lone individual efforts? Surely it is proper for agriculture to get its share of the public funds. At least that is the way Commissioner Mason felt in 1857.

Other topics discussed in this volume were: Animals, land improvement, bread crops, fertilizers, textile and forage crops, fruits, nuts, wine, implements and tools, meteorology, and statistics. Already we have a rather complete outline of the functions later to be assigned to the Department of Agriculture. The determination of the Patent Commissioners to get some sort of agricultural agency set up in the central Government stiffened. They meant business now.

Samuel T. Shugert was in charge of the Patent Office until Joseph Holt (1807-94) became Commissioner, September 10, 1857 to March 14, 1859. Holt, a rather remarkable man was born in Kentucky. Buchanan appointed him Patent Commissioner for his aid in a great Democratic victory. He became Postmaster General of the United States in 1859 and was later the first Judge Advocate General and had much to do with the development of our military law and the supervision of court martial.

Browne edited Commissioner Holt's two agricultural *Reports*. Much work was being done at this time on the tea plant. Holt also held a meeting in Washington of prominent agriculturalists on January 3, 1859, and they enthusiastically approved the agricultural work of the Patent Office. Steam tractors were given an unsuccessful trial about this time and Grimm alfalfa was introduced. Darwin's *Origin of Species* appeared in 1859. The Maryland Agricultural College was opened to students also in that year.

Commissioner Holt began his 1857 *Report* with a few preliminary remarks, after which Browne took over and expatiated upon the public encouragement given to agriculture in Russia, Prussia, and the United States. He launched thereafter into a brief history of American agriculture, starting with the sound premise that the first farmers here were the Indians' wives.

He then told how various countries - Spain, France, and Great Britain - had, from time to time, encouraged agriculture in their colonies by making grants of land or money. Congress had also granted land to Mississippi settlers in 1817 on the understanding that they would till it. In 1838 it had granted to Dr. Henry Perrine a township of 6 square miles in Dade County, Florida, on the implied condition that he would use it for the domestication of tropical plants. His death the next year ended the venture. Federal aid to agriculture was then traced up to the \$60,000 appropriation for 1858.

An interesting discussion of agricultural education was also printed. Judge Buel of Albany had tried in 1838 to establish an agricultural college connected with an experimental farm to be endowed by the State of New York for farmers' sons to attend. In 1853 John Delafield of Seneca County had prevailed on the legislature to pass a law incorporating the New York State College of Agriculture, but no pecuniary aid was forthcoming. Later private individuals and finally the State helped out. Michigan, Pennsylvania, and Maryland had followed suit. Maryland started out in 1856 with a legislative appropriation of \$6,000 a year, on condition that \$50,000 would be raised by private subscription for an agricultural college. The homestead of Charles B. Calvert near Bladensburg, Maryland, comprising 428 acres, had been purchased for the college.

At this time various groups were agitating for agricultural colleges, free land, and more Federal aid for farmers. If Congress would not appropriate money for the colleges at least it should make provision for them in the form of public-land grants. Both movements hit upon the consistent opposition of the southern delegation to Congress which sincerely believed that the doctrine of States rights forbade any such Federal aids. One land-grant college bill did get through Congress during Buchanan's administration, but the President vetoed it because he thought that Federal grants to States were not only extravagant but unconstitutional.

In the volume for 1858 Commissioner Holt's advisory board on agriculture was mentioned, and Browne again discussed agricultural education. Over 1,700 questions had been sent out in the form of questionnaires to various unpaid agricultural correspondents all over the country. Their replies were duly printed under the customary subheads for the information of others. At this point Holt and Browne left office and Shugert again acted for a few days in March 1859.

William Darius Bishop (1827-1904), born in New Jersey, and a former railroad official and member of Congress, was made Commissioner of Patents by President Buchanan March 23, 1859 and served until February 15, 1860, when he went back to railroading and politics. He was followed in office the next day by Philip F. Thomas. Thomas resigned December 13, 1860 without issuing a *Report*. The 1860 publication was edited by the "Superintendent of the Agricultural Division," Thomas G. Clemson, and from December 14, 1860 to March 28, 1861, S. T. Shugert was again Acting Commissioner.

Commissioner Bishop also gave no agricultural statistics in his *Report*. In 1859 he wrote that this agricultural work had now been carried on in the Patent Office for 12 years. In a brief foreword he urgently suggested that the free distribution of domestic seeds be discontinued and only foreign seeds be sent out. The remainder of the money appropriated for seeds might better be spent on agricultural investigations and the compilation of statistics.

The book contained a description with diagrams of the new experimental propagating gardens. Washington's encouragement of agriculture was related and some agricultural history given. D. J. Browne now identified himself as "Superintendent of the Agricultural Division of the Patent Office."

Many articles by different writers were also printed, the same sort of material indeed that later appeared in the *Yearbooks* of the Department of Agriculture. It is interesting to read on page 249 a description of the use of steam plows in England and on page 253 a description of a patent traction engine. Other articles discuss the use of steam plows and steam cultivators in the United States. The book likewise contains a long article by a New York architect, Samuel D. Backus, entitled "Some Hints Upon Farm Houses."

Shugert, the Acting Commissioner, reported for 1860. There were also published some preliminary remarks by Thomas G. Clemson who rather grandly identified himself as the "Superintendent of Agricultural Affairs of the United States." Once more the encouragement given to agriculture by the Governments of various European countries was reviewed.

It was maintained that the United States now needed much more than a mere Agricultural Division in the Patent Office. The division, to be sure, had come a long way since 1842 when it had only one clerk and issued a 20-page report. It now spent \$53,000 a year and had a superintendent, four clerks (including translators and writers), a curator or gardener, and some aides for the latter.

INCREASED RECOGNITION URGED

Nevertheless, there should be an agricultural department. It was natural, of course, that we had none in earlier days but now the need had become urgent. In the past quarter of a century science had fully vindicated itself, and it was the duty of the Government to care wisely for the public domain—a broad hint that arable land was to be regarded as a public trust. These statements undoubtedly reflect the state of enlightened public opinion in 1860.

The Report continued that there was now less necessity than formerly for seed distribution. What was needed was attention to the exhausted soil and greater use of machinery and steam power in agriculture. The agricultural societies, which had obviously been badgering the officials, were urged instead to appeal to Congress for additional public aid to agriculture. Much was also said about the assistance that could be rendered by a good chemical laboratory—for instance in selecting materials with which public buildings were constructed. The Executive Mansion, the central part of the Capitol, the Patent Office, and the Treasury building were already falling to pieces owing to unwise selection of building materials for them.

The question was raised whether the Patent Office should carry on such extensive agricultural work? Was it properly the function of this agency?

The following subjects were discussed in the rest of the book: English husbandry, irrigation, grasses for the South, the diseases of animals, bee culture, fish propagation and culture—a subject long considered agricultural—insects injurious to

vegetation, wine making, grape culture, forests and trees of North America, tea culture, and Chinese agricultural methods. Under cattle diseases the most important subject was contagious pleuropneumonia. The origins of various bureaus are evident in this subject matter—chemistry, entomology, forestry, plant industry, fisheries, animal industry, and so on.

The *Report* for 1861 was issued in 1862 by the new Commissioner of Patents, David P. Holloway. It was the most complete agricultural manual so far issued by the Patent Office, but it contained no statistics other than a few on milk production. It consisted in the main of essays on the current progress of American Agriculture. There was less material extracted from journals, newspapers, and books. Holloway was appointed March 28, 1861 and served till August 16, 1865, after agriculture had left the Patent Office.

In this outstandingly important volume Holloway launched a prolonged and fervent plea for the establishment of an institution to serve agriculture in this country where three-fourths of the citizens were still farmers. Holloway undoubtedly reflected a rising tide of public opinion or he would not have written as he did. He made reference to the wide variety of our soils and pointed out that scientific investigation was needed to ascertain which crops and cultural methods were best adapted to them. He thus coupled successful farming with wise land use. Our soil must be preserved and enriched, he went on. Millions of acres must also be reclaimed.

Why was pork worth \$2.50 a 100 pounds in Illinois and wheat only 25¢ a bushel in Iowa? Why was poor land worth \$100 an acre in New Jersey and rich land worth nothing in Kansas? It was because Illinois and New Jersey had customers right at hand in their cities. The farmer should be aided by the industrialist. There must be integration of agriculture with other industries. This again is a thought Henry A. Wallace reiterated 75 years later.

Worthless breeds of cattle must be supplanted by shorthorns on rich pasture. Agricultural tools and implements should be improved and made more widely available. We ought to have a Ministry of Industry composed of three bureaus: Agricultural, Mechanical, and Commercial. Undoubtedly this plea reflected the activities of pressure groups. The statements by these various Commissioners of Patents indicate very clearly why the Department of Agriculture was finally founded.

The subject matter discussed in these *Reports* is also a clear indication of what was considered important agriculturally at the time, and just why farmers wanted governmental aid. We find articles on the following subjects in the volume for 1861:

History and cultivation of flax and hemp; raising sheep and wool growing; breeding sheep; artificial manures; hog cholera (for which no treatment existed till the Bureau of Animal Industry's Marion Dorset provided it years later); the Territory of Colorado; San Bernadino County, Calif.; raspberry culture; strawberry culture; the worn-out lands of New Jersey; the consumption of milk; cotton in Missouri; the destruction of noxious insects; the pear orchard; farming in New England; Indian corn; hop culture; sorghum culture and sugar making; reports of recent progress in agricultural science; Sandomir wheat; reclaiming salt marshes; food; cultivation of lupine; silkworms of China; horses of New England; wheat-growing in Prussia; a model dairy farm; select cattle breeds; grape growing; the culture of vines and wine making; fruit culture; "Something of the Philosophy and Chemistry of Manures;" and the relation of entomology to soil productivity.

In the 5 years before 1860 agricultural exports averaged \$229,371,400 in value annually and comprised 82.4 percent of all our exports. The South was in the political saddle. Conflict between the industrial North and the plantation South became increasingly severe. The tariff was revised downward to the lowest point on record in 1857, indicating the influence of the South, but the high Morrill tariff was passed in 1861.

FEDERAL DEPARTMENT OF AGRICULTURE RECOMMENDED

The United States Agricultural Society had been organized in 1852, and it ultimately became the most powerful force urging the establishment of a Federal Department of Agriculture. A National Convention of Agriculturalists was called to meet in Washington June 24-25, 1852, and the agricultural society was formed as a result. A hundred and fifty delegates were present and Marshall P. Wilder was elected the society's president.

The organization rapidly drew into its membership the leading farmers of the Nation, and its journal was highly regarded and powerful. From the outset it urgently sought public assistance for farmers, and at each meeting it urged the establishment of a Department of Agriculture with a Cabinet officer at its head. Presidents Fillmore, Pierce, and Buchanan appeared at the meetings of the society, and in 1862 it numbered among its members five living ex-Presidents as well as Lincoln. Many members of both Houses of Congress were duly accredited delegates to the society's conventions - Stephen A. Douglas, Justin S. Morrill, and Horace Greeley among them. It conducted important annual fairs in different parts of the country and had great influence.

The value of farms and farm property in the United States grew rapidly in the decade before the Civil War and production of corn, wheat, and cotton immensely increased. Railroad mileage tripled. Meanwhile Congressional appropriations for agriculture grew, as governmental circles became convinced of the necessity for an agency to serve agriculture. D. J. Browne of the Patent Office was sent abroad to study European agricultural conditions, and a digest of his report appeared in 1860.

The United States Agricultural Society kept up continual pressure, especially through Charles B. Calvert of Maryland, its member, who was elected to Congress July 4, 1861 and placed on the Committee on Agriculture. Calvert worked for a department, not a bureau, though there was much hostility toward the idea of another Cabinet office being established. It was at one time suggested that the head of the department be elected by the farmers. Meanwhile Morrill was making headway on his land-grant college bill.

In 1859 an Advisory Board of Agriculturists met at the request of the House Committee on Agriculture and after discussion made a report recommending the creation of a Department of Agriculture with a Cabinet officer at its head. This report was suppressed though its main recommendation became known. Caleb B. Smith, Secretary of the Interior, wrote in his 1861 Report: ". . . I feel constrained to recommend the establishment of a Bureau of Agriculture and Statistics, the need whereof is not only realized by the heads of department [*sic*], but is felt by every intelligent legislator." Lincoln repeated this suggestion almost verbatim in his message to Congress

of December 2, 1861, sandwiching in the recommendation in an almost offhand and very casual manner. Naturally Lincoln had many more pressing matters then to occupy his attention, but Congress was in the mood to give the idea serious consideration.

Should the new agency be a department or merely a bureau as Lincoln had suggested? Ultimately the House Committee on Agriculture decided in favor of a department in charge of a commissioner, and in such form the bill was finally enacted. It was felt that commercial and manufacturing interests were local in nature so they were omitted from consideration. It was stated they could easily combine among themselves and make their wants felt by the Government, while "Agriculture clad in homespun is very apt to be elbowed aside by capital attired in ten-dollar Yorkshire."

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FAR-REACHING AGRICULTURAL LEGISLATION ENACTED IN 1862

The fact that the Southern delegation no longer sat in Congress naturally facilitated the passage of the bill, because their passion for States rights might well have defeated it. President Lincoln signed the bill May 15, 1862 and it became law. On May 20, he signed the Homestead Act which made provision for apportioning freehold farms of 160 acres each from the public domain to citizens who would make homes on them and till them for 5 years. Then on July 2, 1862 Lincoln approved the Land-Grant College Act fathered by Justin Smith Morrill of Vermont.

LAND-GRANT COLLEGES AUTHORIZED

The last-named law endowed the colleges with 11,000,000 acres of public land, nearly twice the area of Vermont. The States were authorized to sell the land and use the proceeds to endow their respective agricultural colleges. The States were thereafter to operate the colleges themselves. The law is important constitutionally as marking a beginning of Federal grants-in-aid to the States.

DEPARTMENT OF AGRICULTURE ESTABLISHED

Meanwhile the Department of Agriculture had its origin in the office of Commissioner of Patents Holloway, July 1, 1862, and Isaac Newton (1800-1867), who since early 1861 had been in charge of the Agricultural Division, became the first Commissioner of Agriculture. It is of interest to observe that public farm aid was not a nationally pulse-quickenning subject in those days, and in the main the gentleman farmers led the agitation for the establishment of the Department.

Perfunctory mention only was made in farm journals of the fact that the Department had been established, while the press in general ignored the matter. The New York *Tribune's* editorial tribute to the 37th Congress placed the establishment of the Department last of all in the list of its accomplishments, and omitted mention of the Land-Grant College Act altogether. The passage of the Homestead Act, the most liberal land law on record, and one which settled the public domain with great rapidity, did excite some enthusiastic comment.

The Department had been established as a result of no broad, well-thought-out plan, nor was Lincoln in any sense an agrarian leader. There was considerable political inertia on the subject, and rural America largely held to the Jeffersonian maxim that the best was the least government. Senator Hale in discussing the proposed department in fact said that the prevailing farmer attitude was: "For God's sake let us alone!" There was no compact farm bloc, and professional consultants were not in agreement as to procedure.

The gentleman farmer had few aims in common with the dirt farmer. Agricultural educators ranged from enthusiasts for manual-labor schools, to specialized chemists imbued with the minutiae of Germanic laboratory techniques. There was perhaps more interest in the idea of national colleges for the advancement of general scientific principles and industrial education than for agriculture. The West was jealous of eastern control of markets and credit, the East of western cheap production. There was also some fear that the public domain would be exploited for individual benefit. Meanwhile the war burdened agriculture.

Professor Earle D. Ross has stated (*Social Forces* 15:97-104, October 1936) that the new acts really afforded no relief, and he continued: "The department -anomalous in nature since while independent it was not of cabinet rank -was launched under political rather than scientific auspices with an amiable but incompetent, politically-scheming market gardener at the head. The scientists, the brain trusters of their day, were neglected or, in certain notable cases, summarily dismissed." In other words the opportunity to plan a "new deal" for agriculture was missed.

The Department mainly concerned itself with distributing exotic seed, and largely lost the respect of agricultural scientists and journals. It did not appeal to the actual soil cultivator or dirt farmer for many years. The Nation made no effort to plan land settlement soundly and control land speculation and exploitation. As a matter of fact no controls were lodged in the new Department. Food was needed for the Civil War, so an unnatural extension of farm-crop belts took place and new machinery was widely utilized.

Economists of the day took the farmer for granted or ignored him. In the light of hindsight the time was strategic for planned regulation to prevent the looting of natural resources and for putting more government into the disorderly business of agriculture. The provision of better farm credit facilities at that time might have forestalled later "greenback" discontent. The orderly development of land use and occupation would have balanced rural-urban populations more scientifically. But there was no national economic or agricultural policy then.

Voluntary efforts to effect control of certain problems affecting a large number of the wealthier farmers had failed. Such efforts to teach skills and production methods as were pursued by the agricultural societies were inadequate, and the societies themselves now insisted that the Government take over these functions. The growth of commercial farming went on apace, and many farmers now produced commodities that went floating down canals or spinning away on rails to consumers they never saw. Such farmers formed part of the money economy, and they wanted to gain some measure of equality with the businessmen with whom they dealt.

The act establishing the Department of Agriculture reads thus:

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That there is hereby established at the seat of Government of the United States a Department of Agriculture, the general designs and duties of which shall be to acquire and to diffuse among the people of the United States useful information on subjects connected with agriculture in the most general and comprehensive sense of that word, and to procure, propagate, and distribute among the people new and valuable seeds and plants.

SEC. 2. *And be it further enacted*, That there shall be appointed by the President, by and with the advice and consent of the Senate, a "Commissioner of Agriculture," who shall be the chief executive officer of the Department of Agriculture, who shall hold his office by a tenure similar to that of other civil officers appointed by the President, and who shall receive for his compensation a salary of three thousand dollars per annum.

SEC. 3. *And be it further enacted*, That it shall be the duty of the Commissioner of Agriculture to acquire and preserve in his Department all information concerning agriculture which he can obtain by means of books and correspondence, and by practical and scientific experiments, (accurate records of which experiments shall be kept in his office,) by the collection of statistics, and by any other appropriate means within his power; to collect, as he may be able, new and valuable seeds and plants; to test, by cultivation, the value of such of them as may require such tests; to propagate such as may be worthy of propagation, and to distribute them among agriculturists. He shall annually make a general report in writing of his acts to the President and to Congress, in which he may recommend the publication of papers forming parts of or accompanying his report, which report shall also contain an account of all moneys received and expended by him. He shall also make special reports on particular subjects whenever required to do so by the President or either House of Congress, or when he shall think the subject in his charge requires it. He shall receive and have charge of all the property of the agricultural division of the Patent Office in the Department of the Interior, including the fixtures and property of the propagating garden. He shall direct and superintend the expenditure of all money appropriated by Congress to the Department, and render accounts thereof, and also of all money heretofore appropriated for agriculture and remaining unexpended. And said Commissioner may send and receive through the mails, free of charge, all communications and other matter pertaining to the business of his Department, not exceeding in weight thirty-two ounces.

SEC. 4. *And be it further enacted*, That the Commissioner of Agriculture shall appoint a chief clerk, with a salary of two thousand dollars, who in all cases during the necessary absence of the Commissioner, or when the said principal office shall become vacant, shall perform the duties of Commissioner, and he shall appoint such other employes as Congress may from time to time provide, with salaries corresponding to the salaries of similar officers in other Departments of the Government; and he shall, as Congress may from time to time provide, employ other persons, for such time as their services may be needed, including chemists, botanists, entomologists, and other persons skilled in the natural sciences pertaining to agriculture. And the said Commissioner, and every other person to be appointed in the said Department, shall, before he enters upon the duties of his office or appointment, make oath or affirmation truly and faithfully to execute the trust committed to him. And the said Commissioner and the chief clerk shall also, before entering upon their duties, severally give bonds to the Treasurer of the United States, the former in the sum of ten thousand dollars, and the latter in the sum of five thousand dollars, conditional to render a true and faithful account to him or his successor in office, quarterly accounts of all moneys which shall be by them received by virtue of the said office, with sureties to be approved as sufficient by the Solicitor of the Treasury; which bonds shall be filed in the office of the First Comptroller of the Treasury, to be by him put in suit upon any breach of the conditions thereof.

Approved, May 15, 1862.

AUTHORITY BROAD BUT WORK RESTRICTED

The act offers no evidence that any balanced social and economic program for agriculture was even desired, much less visualized, at the time. Yet the law was very broad in scope. It gave the Department the greatest latitude and discretion. Certainly it would appear that the Department has had ample legal authority for all of its subsequent activities. It is also of interest that the act prescribed the appointment of professionally qualified employees.

Isaac Newton, the first Commissioner of Agriculture, was born in New Jersey but grew up in Pennsylvania. He served from July 1, 1862 until his death in office on June 19, 1867. He was a Quaker of farmer stock and limited formal education. When he grew to maturity he managed two large farms in Delaware County, Pennsylvania,

so well that they became celebrated as model farms. He early became an active member of the Pennsylvania State Agricultural Society. In 1854 he purchased a thousand acres of land in Prince William County, Virginia, but the outbreak of the Civil War rendered his venture unsuccessful.

Newton was personally acquainted with Lincoln—one story has it that he delivered milk to the White House—who placed him successively in charge of agricultural work in the Patent Office and in the Department. As botanist and superintendent of the propagating garden Newton appointed William Saunders, a Scot, who came to the United States in 1848. Saunders sprang from a long line of gardeners, and he served efficiently for many years. It was he who, about 1873, helped bring about the introduction of orange growing in California. Newton retained Townend Glover as entomologist and appointed Charles M. Wetherill (1825-71) chemist. Wetherill, born in Philadelphia, had been graduated from the University of Pennsylvania, after which he studied in Paris and Berlin and became a private research worker and instructor in chemistry when he returned to the United States. Lewis Bollman was appointed statistician.

The propagating garden is mentioned in Newton's Reports for it had been placed under his care. It was at 6th Street and Missouri Avenue, Northwest. The Department was also assigned Reservation No. 2, a tract of about 40 acres lying between 12th and 14th Streets Southwest and South B Street and the canal, and now forming part of the Department's grounds. This was to be used as an experimental farm. Newton's own office remained in the Patent Office building.

FIRST RESEARCH PAPER IS ISSUED

In early 1863 Newton reported for the last half of 1862 to President Lincoln. Wetherill had been appointed chemist effective August 21, 1862, and he published his first scientific paper in that year—a 6-page leaflet entitled *Report on the Chemical Analysis of Grapes*. In the course of this technical publication Wetherill requested Congress to give him enough money to put his chemical division in shape to render effective service. This was the first research paper published by the Department of Agriculture. Within the next 75 years more than 8,400 research papers in the field of chemistry alone were published from the Department.

Newton began by quoting and discussing the organic act of his Department. He also reported that between July 1, 1862 and January 1, 1863 he had expended the sum of \$34,342.27, leaving an unexpended balance of his appropriation of \$25,657.73. He asked Congress to grant him \$130,000 for the fiscal year to end June 30, 1864, "which is deemed a low estimate." In spite of the war, crops, he said, had been abundant and exports greater than ever before.

Newton discussed the history of agriculture beginning with ancient Rome, attributing the fall of Rome to the refusal of Romans to till the soil. He skimmed through the subsequent history of agriculture and observed that little real progress had been made until the past 30 years. The cast-iron plow, patented in New Jersey in 1797, had recently undergone various helpful modifications and the increasing use of agricultural machines was a good sign. Crop yields and values were reported in detail.

The first necessity in the promotion of agricultural prosperity was peace; the second, continued and increasing foreign and domestic demand for agricultural products; the third, increased respect for labor; the fourth, a more thorough knowledge and practice of agriculture as an art and a science; and the fifth, a more thorough education of farmers in the physical sciences, political economy, and general reading.

THAT "TWO-BLADES-OF-GRASS" SLOGAN

Hitherto the American farmer had been taught, and had become accustomed, to cultivate a primitive soil. He must now unlearn these old habits and theories and be taught instead how to utilize manures, crop rotations, careful cultural methods, and intensive cultivation. He could no longer move on to a rich-land frontier so easily; he must stay put. The old routine of tilling, sowing, and harvesting was useful enough when plenty of unoccupied rich land was available. He must now learn, in Newton's words - though he quoted the phrase, "'to make two blades of grass grow where but one grew before.'"

Consequently science, "[the] *what* and *how* to do . . . the concentrated experience of the ages," must be invoked. For science was "classified knowledge illustrated in practice and confirmed by experience, and as certain and eternal as truth itself." Applied chemistry stood foremost; it would reveal the nature and composition of soils as well as the kind, use, and value of manures, and the principles of nutrition. Had not Sir Humphry Davy said: "Nothing is impossible to labor aided by science?"

The labor of one man profited him five times more in Massachusetts than in South Carolina simply because knowledge was power in the former State, said Newton. The farmer must therefore study all the sciences to be successful: Meteorology, electricity, botany, hydraulics, vegetable physiology, geology, anatomy, animal physiology, and animal and plant pathology. All of Newton's reports were eruditely and sonorously phrased.

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OBJECTIVES OF DEPARTMENT TAKE SHAPE IN 1862 AND AFTER

As immediate objectives Newton stated that his Department would:

1. Collect, arrange, and publish useful agricultural information;
2. Collect and introduce valuable plants, animals, and seeds;
3. Answer the inquiries of farmers and be guided by them in selecting subject matter for publication;
4. Test by experiment the use of agricultural implements and the value of seeds, soils, manures, and animals;
5. Undertake the chemical investigation of soils, grains, fruits, vegetables, and manures, publishing the results;
6. Promote botany and entomology;
7. Establish a library and a museum.

To begin with, the Department would institute chemical investigations, investigate cotton culture, seek to introduce silkworms from China, promote the culture and use of flax and hemp as substitutes for cotton—this by special act of Congress, and introduce and naturalize the "alpacca," and the true opium poppy! Said Newton: "It is hard to realize, and yet as true as Holy Writ, that some who shall read to-day these lines, will live to see one hundred millions of freemen dwelling in this dear land of ours."

The volume also included Reports from chemist Wetherill and statistician Bollman. It is unfortunate that space will not permit us to dwell further upon this book of 632 pages, containing as it did articles of such wide diversity of subject matter. It is especially unfortunate that we can do no more than hint at the human-interest value of certain of these contributions.

One contributor, Dr. W. W. Hall of New York City, wrote a veritable classic on the "Health of Farmers' Families," with a special section on the "Hardships of Farmers' Wives" which is urgently commended to the attention of historians and antiquarians. Again in the *Report* for 1863, Dr. Hall wrote at great length and with much, perhaps wholly unconscious, humor, on "Farmers' Houses." His discussion of current medical theories and the philosophy of outhouses must be read to be appreciated.

There should also be mentioned at this point the article by Mrs. L. B. Adams of Detroit on "Farmers' Boys," printed in the 1863 volume, and the one by Mrs. Lavinia K. Davis of Warner, New Hampshire, on "Female Life in the Open Air," which appeared in the *Report* for 1866. In 1866, also, Miss L. C. Dodge of Nashua, New Hampshire, wrote comprehensively on the "Education of Farmers' Daughters." All these articles reflect trends of thought considered important at the time of their publication.

The earliest bound volume of Department of Agriculture publications now in the Department Library begins with a circular from the Commissioner himself on the *Present*

Agricultural, Mineral, and Manufacturing Condition and Resources of the United States, dated 1862. Next there is a *Catalogue of the Plants, Bulbs, Tubers, Etc. for Distribution from the U. S. Propagating Garden, with a report on the Objects and Aims of the Garden* by its superintendent, William Saunders, dated the same year. Then follows the *Report on the Chemical Analysis of Grapes*, by chemist Charles M. Wetherill, who concluded that our wine grapes were as good as those of Europe.

The Commissioner's report for 1863 contained meteorological data supplied by Joseph Henry of the Smithsonian Institution. The publication of such data continued until the weather work was transferred to the Army Signal Corps whence in 1891 it returned to the Department.

Between December 31, 1862 and November 30, 1863 the Department had expended \$87,792.96. The appropriation for that year had been only \$95,000 and not the \$130,000 Newton had requested. There had been a special appropriation of \$20,000 for hemp and flax investigations which was not yet expended. On June 30, 1864 the unexpended balance was \$52,883.02.

There was a long discussion of the "neglected agricultural" State of Virginia, with predictions of what it would become "at the close of the present unnatural and causeless war" when a new and better life awaited it. Agricultural information was said to be coming in from widely scattered correspondents who worked without payment. Seed distribution flourished. Facilities must be provided for experimentation and for more office and laboratory space as well. Reservation No. 2 had had to be given over to the Army for use as a cattle yard, and the half-dozen rooms the Department occupied in the basement of the Patent Office were much too confining. Newton advocated increased appropriations.

True, he said, some held that the farmer only wanted to be let alone, but farmers were free to accept or reject the aid offered them by the Department. There was no compulsion about it. Furthermore farmers on the Atlantic seaboard were still plowing the same stones their great-grandfathers had plowed before them. Such fields should have been given over to timber long ago—a very modern idea in wise land use and quite in line with current policy. Newton said that this business of using 10 acres of land to grow 200 bushels of corn, when 4 acres of good soil would do the job, should cease.

Possibly some farmers did only want to be left alone, but they were ignorant, and they should not go on that way. Farmers have neither the time nor ability to experiment and investigate soil and plant relationships, nor can isolated individuals collect and arrange stores of knowledge for practical use. Hence a Department is needed. By aiding tillers of the soil it will benefit all.

WHY NOT STUDY THE WEATHER?

Immense benefit would accrue if weather conditions could be telegraphed to the Department from various stations and then given to the public. Agricultural statistics should be encouraged for they form the "key which is to unlock the hidden treasures of maturing nature." Commissioner Newton visualized the Nation as: "A mighty giant, resting firmly on the soil and acquiring development and strength by toil, by thought, and by equity."

Newton mentioned buildings, but only in 1867 did Congress appropriate \$100,000 to build for him at 12th and B Streets, Southwest. A stable was erected in 1879, and \$25,000 was appropriated to put up a building for the Seeds Division and the Division of Statistics in 1881. A greenhouse was erected in 1883, then no more new buildings until 1897.

LIBRARY AND PUBLICATIONS GAIN ATTENTION

The Commissioner recommended the founding of a library. One had been started in the Patent Office in 1840 when a clerk was appointed to gather statistics and useful agricultural material. In 1869 the Department got these books and added them to its own incipient library. This occupied the entire west end of the first floor of the new Department building. J. B. Russell, the first librarian, was appointed in 1871.

The early publications of the Department were chiefly in the form of scientific reports, and the annual, and later monthly, reports. The distribution of the latter was effected politically, and many who needed and could have used the publications failed to get them. Later bulletins began to appear independently from the various divisions of the Department.

Sublime faith in statistics was prevalent among Department officials. Writing in 1872 on *The Department of Agriculture, Its History and Objects*, James M. Swank, then its chief clerk, said: "the Department had aided greatly, by the publication of tables of this character [statistical], in protecting alike consumers and producers from the exactions of grasping speculators." Swank quoted a Maine farmer who wrote in saying that monthly statistical reports from the Department enabled him to know just what to do, for, "'Knowing the supply and demand, I am able to sell at my own price, and we can also foresee what will probably be wanted next year.'" That was Newton's idea too.

Jacob R. Dodge, who was appointed statistician in 1866, was a distinguished man in his specialty, and he served the Department well for 24 years. Statistics were long regarded as almost a divine revelation and as constituting the physics and physiology of society. Investors and speculators spent huge sums to obtain figures from which to predict market fluctuations. Reliable crop information should therefore set the farmer right up in the world; he could then foil speculators by withholding his crops from market till the right time.

It was a beautiful theory but did not work, partly because too few farmers fully understood the implications of the statistics provided for them. It also failed in larger measure because individual farmers were in no position to do anything effective in the light of the statistics even if they understood them and the figures were reliable.

The Department began to publish monthly reports about 1864 and continued doing so till around 1876. These acted as a kind of agricultural periodical and were replaced by the publication of bulletins and regular periodicals in later years.

WORK IS SUBDIVIDED

Newton's statement to Lincoln for 1864 was dated December 1 of that year. He said that he had now divided the work of the Department into the following categories: (1) The collection of statistics relating to annual crops; (2) the preparation of tables on the production and value of domestic products; (3) the collection of information on general and important topics relating to agricultural production; (4) the publication of monthly and bimonthly reports.

Much information was still obtained by unpaid correspondents to whom circular questionnaires were addressed. The *Report* also contained special articles on such subjects as clover, lime, plaster as a manure, sheep farming in the Pampas, and so on. Frequent and prompt publication was declared to be fundamentally important.

The Commissioner had again tried to gain possession of Reservation No. 2, but the Army still retained it. He did procure its use soon after, and he also managed to rent two small basement rooms near his office for additional space. A large force of laborers was put on the reservation to clear it, and it was then to be used for testing the merits of various plants. Soon 67 varieties of potatoes and as many of spring wheat and 55 of fall wheat were under test. In 1865 a geological and mineral cabinet was provided.

Newton wrote that there was great demand for free seeds and that interest in sugar beets increased. He thought we should try to produce our own sugar, and chemists of the Department worked on this many years. He noted that his *Report* for 1863 had just been issued. It was delayed by a shortage of paper at the Government Printing Office. His total annual appropriation had been \$150,604.05. He renewed his suggestion about sending weather reports by wire.

Indicating the agricultural interests of the time were articles on the past, present, and future of Virginia, on the culture and management of forest trees, on "Sorghum, or Northern Sugar cane," and on "Cotton." Other articles discussed the hop plant, garden vegetables, grapes and fruits, sheep, cattle, barns, green manuring, the seasons, game birds, New England birds, birds and bird laws, fresh- and salt-water aquaria, Pacific State textile fibers, foreign consular correspondence, and wool and woollen mills.

The chemist, now Henri Erni, reported on fermentation studies, the analyses of wines, coal, soil, asphalt, and guano. The volume also contained a Report by entomologist Glover, the gardener's Report, and both agricultural and weather statistics. When Newton next wrote the Civil War was over.

During the war there had been an era of prosperity in some areas. The Corn Belt had begun to be stabilized in the present area. Wisconsin and Illinois were still the chief wheat-producing States, but the Wheat Belt began to move generally across the Mississippi. The Cotton Belt had also begun to move westward, away from the exhausted lands of the Southeast. Northern export of food increased, though for the time being the South could not export its cotton. Industry expanded in the North, while sharecropping began to replace slavery in the South.

On November 27, 1865 Commissioner Newton reported to President Johnson for 1865, the fiscal year obviously including part of 1864, and the *Reports* thereafter appeared in the early fall. It was a time for reconstruction. Some departmental scientists had been sent to Europe and Asia to make observations, and they traveled very economically. In fact Townend Glover had attended the entomological exhibit in Paris and it cost only \$500 to send him there.

RETARDING INFLUENCES EVIDENT

Saunders was actively at work on Reservation No. 2 now. Oranges, tea, coffee, silk, figs, olives, cinchona, new cultural methods, fruits and nuts, suitable grasses, forestry, and reclamation one by one engaged attention. Still the Department lacked financial support commensurate with the tasks assigned it, and it did not have proper research equipment to make fundamental studies of complex agricultural problems.

Politics also prevented sustained and vigorous leadership and often necessitated the continuation and even increase of questionable policies, like seed distribution, once they were undertaken. This sapped energies that should have had other use. In a broad but somewhat ineffective way the Department sought to increase the field of human knowledge and to solve the problem of raising and stabilizing farmer income through the spread of accurate statistical information. The departmental chemist was now working on sugar beets, sugarcane, soils, copper ore, and oil rock—some of his time apparently being applied to nonagricultural tests.

In July 1866 Commissioner Newton sat in his office and heard a thunderstorm approaching. He remembered certain wheat-variety samples that had been cut and should be kept out of the rain. So he grabbed his hat and hastened from his office to the experimental farm a mile or so away to supervise the rescue of the samples. He stood there in the hot sun, wearing his silk hat, until the work was done. As a result he suffered sunstroke from the effects of which he never recovered. He died on June 19, 1867.

In the 1866 volume, the last issued by Newton, agricultural progress since the war was extolled. The Commissioner skimmed through varied specific accomplishments, again emphasized the necessity for prompt and frequent publication, observed that unpaid correspondents rendered him great service, and said that the Department had spent \$162,600 and still had \$85,084 on hand.

HOME ECONOMICS ON THE HORIZON

Thomas Antisell, M.D., was now chemist. He reported on soils, grapes, wines, sugar plants, and minerals. Mrs. Davis in her article on "Female Life in the Open Air" was accusing hot bread, "indigestible as putty," of causing epidemics of dyspepsia and advising young women to get more oxygen into their lungs. Miss Dodge, writing on the "Education of Farmers' Daughters," observed that the Arabs permitted divorce in case the wife could not make good bread, and added that a woman was "a broken reed" who could not produce "the staff of life." Domestic science and home economics were on the horizon.

Chief Clerk John W. Stokes was Acting Commissioner from June 20, 1866 until December 4, 1867 when Horace Capron (1804-85) was appointed Commissioner. Capron was born in Massachusetts, but grew up in New York. In 1836 he erected and became superintendent of a cotton mill at Laurel, Maryland, which he made into a model factory. Capron had acquired the Snowden estate by marriage and engaged in scientific farming so successfully that he is said to have made \$36,000 at it in one year. He left Laurel after his wife's death, became a cattle breeder, and later entered the Army. Upon his resignation as Commissioner on June 27, 1871 he went to Japan to become agricultural adviser to the Japanese Government. He returned in 1875 and lived in Washington until his death.

Stokes not only reported Newton's death but also took the opportunity of saying that he felt the employees of the Department were inadequately compensated. He also thought that a suitable home near the Department building should be provided for the Commissioner whose social position demanded it. Because of Newton's protracted illness there had been delay regarding the contract for the new building, but it had now been awarded and the structure was ready for roofing. The frontispiece of the *Report* depicted steam plowing.

Commissioner Capron manifested considerable interest in steam plowing and reported that 3,000 steam plows were at work in England and only 2 in the United States. Later in the book appeared a 10-page article on the "History of American Inventions for Cultivation by Steam." It was written by a patent examiner and was well illustrated. Other articles on steam plowing covered about 18 pages. In one of them readers were told that a single steam plow would do the work of 30 horses and would cut production costs as well as reducing labor requirements.

Capron remarked that the seed establishment in the Department had grown "into a sort of fungus, of little value in itself, while it absorbed largely of the nutriment required to sustain the vital functions of the department." The new Commissioner said he had reorganized the Department, making drastic changes. At this time, January 13, 1868, the Department had about 47 employees distributed as follows:

1 statistician; 1 entomologist; 1 chemist; 1 assistant chemist; 1 superintendent of the experimental garden and 1 assistant; 1 botanist; 1 superintendent of the seed room and 1 assistant; 1 librarian; 1 disbursing and auditing officer; 3 fourth-class clerks; 4 third-class clerks; 6 second-class clerks; 7 first-class clerks; 5 copyists and museum attendants; 1 chief messenger and 2 assistants; 2 workmen; 6 laborers.

The chemist in the main concerned himself with beet sugar and soils. The book contained significant articles on the culture of the orange and citron, fruits of Florida, China grass, water for destitute regions, farmers' clubs, and the necessity for diversification of agricultural production.

NEW BUILDING COMPLETED

In 1868 Commissioner Capron could report to President Johnson that the new building was at last completed. It was of Renaissance architecture, 3 stories high, and 170 by 61 feet in dimensions. Its steam-heating apparatus was said to be in successful operation. Including furniture and laboratory equipment it had cost \$140,420.

The volume contained discussions of agricultural and industrial education, systematic agriculture, southern agriculture, Canadian reciprocity, the agricultural resources of Alaska, silk culture, practical entomology for farmers' sons, a report of progress in fish culture, current facts in agriculture, State reports on agriculture, and reviews of recent agricultural books. C. C. Parry had been appointed botanist on the advice of Joseph Henry.

HIGHLY QUALIFIED STAFF REQUESTED

Reporting to President Grant for 1870 Commissioner Capron again protested the insufficient remuneration of his staff and asked much larger appropriations. He reported expenditures of \$169,175.24. Regarding the Department employees he wrote:

Its [the Department's] work demands a higher order of talent than the routine service of most public business; it requires a knowledge of national economy, social science, natural history, applied chemistry, animal and vegetable physiology, and practical agriculture; and presents so broad a range of facts in each field of investigation as to demand the most active effort and the most persistent industry. For such labor the most meager compensation only is offered, and it is found difficult to obtain an increase of suitable service, and impossible to remunerate properly that already employed which is found to be most efficient and reliable, while that which is practically useless for the purpose is offered in unlimited measure. A just and wise revision of clerical salaries would greatly increase the efficiency of the Department.

Reading between the lines it seems evident that the services of many political hacks had been pressed upon the Commissioner. He was well aware, however, that departmental functions could be carried on properly only by highly qualified professional employees.

Certain work the Department was carrying on at this time paved the way for the establishment of the Bureau of Fisheries later. The Division of Botany had been organized in 1868. The experimental farm was abolished because it was too small, and it was later landscaped.

There were articles in the *Report* on soil and climate, on forestry, dairying, agricultural machines, and Virginian agriculture. The setting up of a Division of Entomology was announced, while cattle diseases also received considerable attention. Chemist Antisell had been analyzing meat extracts and American Indian foods.

President Grant appointed Frederick Watts (1801-89) to succeed General Capron, and he took office August 1, 1871. Watts was born in Pennsylvania of Welsh extraction. After his father's death he grew up on his uncle's farm and acquired a taste for and interest in farming. He studied law and was president of the Cumberland Valley Railroad Company from 1845 to 1871, but he had had time also to engage in scientific farming. Watts had experimented with various types of farm buildings and had organized farm societies. He was the first head of the Department to give attention to our timber supply. His reports are dated from 1871 to 1876.

Watts found the following Divisions in the Department: Chemistry, Horticulture, Entomology, Statistics, Seeds, and Botany. He established a Division of Microscopy

in 1871 with Thomas Taylor in charge. Taylor turned out to be a rather remarkable scientist, who later investigated cranberry rot, mushroom culture, grape mildew, peach yellows, black knot of plums—and in every case aided the growers financially. Much later he also discovered how to recognize adulterated butter by microscopic examination.

Watts appointed the statistician, J. R. Dodge, to serve also as editor and the latter complained that it was very difficult to get properly qualified persons to compile and edit agricultural reports, because the compensation, \$1,200 to \$1,800 a year, was insufficient to attract workers with broad agricultural experience and high literary attainments. He continued that it was a defect of the public employment system that exceptional experience and technical skill were rarely recognized. Hence a dead level of mediocrity prevailed.

Watt's Reports tended to fall into a rather dull routine. In 1872 the Department had an appropriation of \$197,070 of which all but \$1,278.82 was expended, but that was said to be sufficient to cover outstanding bills and still leave a small margin for return to the Treasury. In 1873 the Commissioner spoke of the increasing importance of entomology, and noted the monetary extent of insect damage.

The chemist, William McMurtrie, was devoting his time to agricultural products. Watts had been annoyed by private individuals who wanted the departmental chemist to test wines, patent medicines, and mine samples for them, and even to give them certificates of merit. Since there had been loud complaints about frauds in commercial fertilizers the chemist was told to analyze some of them and publish the results.

During Commissioner Watts' term of office the Department began to test the seeds it distributed. In 1874 Watts complained that delay in the publication of the *Annual Report* had crippled the Department's work. He added, however, that the employees were earnest, faithful, and industrious.

In 1875 Watts handed in a rather terse routine Report in which he spoke about forestry and the 200 to 4,000 letters that reached the Department daily. In 1876 he congratulated himself on having handled the Department's accounts with accuracy and fidelity.

In 1872 when James M. Swank wrote his brief account of the Department's history and development, J. R. Dodge was statistician, William Saunders the superintendent of gardens, Townend Glover entomologist, Ryland T. Brown chemist, George Vasey botanist, J. R. Russell librarian, and Andrew Glass superintendent of the seed room. The Department had 50 clerks and specialists and 50 messengers, laborers, and other employees.

While the Department was growing, the Nation's agriculture was experiencing both progressive and retrogressive influences. The commercial value of farm land continued to rise as cities grew and markets expanded. Settlement of the Great Plains was accelerated by the cattle boom, the panic of 1873, and the development of Glidden barbed wire. Many State colleges of agriculture undertook experimental work during

this period. On the other hand, only 47.4 percent of all persons gainfully employed were engaged in agriculture. Economic and social maladjustments had set the Grange on the march, and the Farmers' Alliance was just over the horizon.

President Hayes, on July 1, 1877, appointed William G. Le Duc (1823-1917) Commissioner of Agriculture. The latter was born in Ohio, the son of a French father who had come to the United States to help the colonists in the Revolutionary War. Le Duc had studied law, been admitted to the bar, and had become active in and around St. Paul in the development of the farm country. He served in the Union army and later entered railroading. As Commissioner he established a tea farm and was greatly interested in sugar beets, sorghum, and animal diseases, the last interest culminating in the Bureau of Animal Industry.

Commissioner Le Duc's first *Annual Report* was for 1877. In it he presented a table to show that the Department of Agriculture received small appropriations as compared with other Federal Government agencies. The War Department was to get a little less than 2 million dollars in 1878, the State Department over 1 million, the Treasury Department nearly 13 million, the Navy Department less than 500 thousand, Interior about 3½ million, Indian Affairs nearly 5 million, and Agriculture only 209 thousand.

The diseases of domestic animals occupied a great deal of space in this volume. There was much agitation among the States regarding animal plagues, as local efforts at control were proving unavailing. Hence Federal legislation was being urged. The book also contained material on orange cultivation and the Chinese tea plant. Dr. Franklin B. Hough was appointed Forest Commissioner, the beginning of the present Forest Service.

Commissioner Le Duc's *Report* for 1878 was long and inclusive. It stated that the laboratory was confined to two small rooms, a closet, and a furnace room in the cellar, and therefore could not be properly utilized. The Chemical Division needed both more space and more equipment. Furthermore the chemist had received only \$1,900 of his \$2,000 salary and the assistant chemist but \$1,400 of his \$1,600 because of deficient appropriations. Even their full salaries were deemed too small.

FOOD AND DRUG WORK BEGINS

It is interesting to observe that the chemists had analyzed cream puffs and coffee suspected of being poisonous, as well as adulterated tea and bologna sausage. This work had been done for the health officer of the District of Columbia. The way was opening for food and drug work as the laboratory had already analyzed certain pharmaceutical preparations. The chemists had in addition examined certain coffee and tea substitutes, a tonic called Boneset, some baking powders, and butters and oleomargarines. Peter Collier, who was now chemist, had also worked cooperatively with the botanist on forage grasses.

Again there was a great deal about diseases of domestic animals, and a veterinarian contributed a long article on glanders. In 1878, under a special appropriation

from Congress, the sum of \$10,000 was expended in studying the diseases of hogs and domestic animals. The *Report* called attention to the fact that pleuropneumonia was raging among cattle.

VETERINARY DIVISION ESTABLISHED

In 1879 a Veterinary Division was established to carry out fully the work on animal diseases. Congress had also appropriated \$10,000 for study of the history and habits of insects. Veterinarians contributed long articles on animal diseases in this 1879 volume.

The last account submitted by Le Duc was that for 1880. Herein the Report of chemist Collier to the Commissioner covered 147 closely printed pages, with 14 large graphs in color folded in. Le Duc stated that the Division of Chemistry was "now confined to a room in the present building 20 feet square, with two basement rooms of the same size, and a small closet." What chemist Collier might have done had he had space no one knows.

The Commissioner felt that this "national laboratory of a great people" should have better facilities. Its chief then had 11 assistants, mostly young chemical-school graduates. The chemist reported making analyses of concentrated stock feeds, veterinary remedies, and even a magic metal polish. The names, manufacturers, and full analyses of the products were printed, and it was slyly hinted that they were neither worth the price asked for them nor capable of living up to their makers' specifications.

Le Duc also wrote that the departmental employees received lower pay than those doing similar work in other Departments. His distinguished chemist received only \$2,000 a year (when he got it) for his "laborious and valuable" services, whereas a chemist who worked a short while detecting fraud in sugar for the Treasury Department received four times that much for his work and earned it, too.

In 1880 the Commissioner himself received \$3,500 a year; the chief clerk, the chemist, the statistician, the entomologist, and the superintendent of grounds \$2,000 each; the botanist, the microscopist, the disbursing clerk, and the superintendent of seed distribution \$1,800 each. Le Duc said that the departmental chemist actually received less than many clerks in other Departments. A general increase in salaries commensurate with the work performed would be only just.

The *Report* contained many brief items of information on a wide diversity of topics. One of these on page 616 is of interest in explaining why Harvey W. Wiley began to work on foods and drugs in the Department a little later.

We have had frequent communications respecting the adulteration of foods, in respect of which our correspondents err in presuming that the remedy therefor lies with this department. Inquiries are made whether, if there be no more ready remedy, it is not within the power of Congress to pass a stringent law making it a crime to manufacture spurious articles or to adulterate genuine ones. Admitting the subject to be one of great and universal interest, we have only been able to say to our correspondents, that under the present standard of commercial morality, nothing is safe from adulteration; that the action of the general government is limited to imported articles, and chiefly to drugs; that the power of the government ceases with the custom-house; and that the general regulation of the subject is left to the several States, in most of which there are laws designed to remedy the evil, which, however, can only be done effectually by a rigid system of inspection. Merely prohibitory laws are of little value against human ingenuity and cupidity.

New methods of food processing, preservation, and transportation moved on rapidly, providing opportunities for fraud, adulteration, and misbranding. The public was not long satisfied with State regulation, and Federal intervention was finally demanded.

Dr. George B. Loring (1817-91), of Massachusetts, educated as a physician but also a scientific farmer and a Victorian-type political orator, was appointed Commissioner of Agriculture by President Garfield, July 1, 1881. Loring had operated a stock farm and had done much to further agriculture throughout his life.

Loring's first volume bears the dates 1881 and 1882. D. E. Salmon, later to be first chief of the Bureau of Animal Industry, and already a distinguished scientist, was in charge of the Veterinary Division. Reports were printed by several veterinarians regarding contagious pleuropneumonia, and agitation was rife for Federal action.

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ORGANIZATION AND GROWTH IN 1883 AND AFTER

In 1883 the Department consisted of the Division of Gardens and Grounds; the Botanical Division; the Microscopic Division; the Chemical Division; the Entomological Division; the Division of Statistics; the Veterinary Division; the Forestry Division; and the Seed Division.

Texas or southern fever in cattle now occupied much of Dr. Salmon's attention. He was perplexed just then because sick animals did not always transmit the disease while well ones often did. He mentioned the recent discoveries of Pasteur and said that he thought the Department should supply vaccines for the contagious diseases of cattle. Not many years later Theobald Smith, F. L. Kilborne, and Cooper Curtice solved the cattle-tick fever puzzle in the Bureau of Animal Industry by proving that the tick was the transmitting agent. This was a fundamental medical discovery of far-reaching importance.

In 1883 the chemistry of sugar plants was being studied. A study of butter and of its adulteration was under way "to aid the dairy interest in establishing a standard of good butter and to protect the consumers against fraud." This gives evidence both that dairying received departmental aid and that the protection of consumers against fraud was regarded as a departmental function. Harvey W. Wiley, who was already an assistant chemist in the Department, reported on an investigation of sorghum cane.

Loring, who was still Commissioner, now referred rather grandly but inaccurately to his "bureaus" of statistics, botany, chemistry, entomology, and forestry - for they were still divisions. However, the Bureau of Animal Industry had been placed in the Department with full bureau status by an act of Congress approved May 29, 1884. Wiley reported on sugar plants and adulterated butter, while Hough protested against the ruthless destruction of forests and cited the need for Federal action. Congress had made a special appropriation of \$15,000 for an investigation of silk culture.

The first Report of the Bureau of Animal Industry was in the main devoted to contagious pleuropneumonia and cattle-tick or southern cattle fever. This Bureau had come into existence largely because, as the story goes, Peter Dunn, a milkman near South Ferry, New York, bought a cow from the captain of the English ship *Washington* in 1843. The cow had contagious pleuropneumonia, and it infected Dunn's entire herd. The infection spread rapidly and disastrously and was soon rampant in five or six States.

Until 1879 national authorities and livestock men tried to ignore the menace, but on February 6 of that year the British Privy Council decreed that all cattle imported from the United States be slaughtered on the dock in a limited time. The price of American steers promptly dropped to \$10 below that paid for similar Canadian animals. An annual loss of well over a million dollars seemed inevitable to cattle growers.

The States next tried to control this disease by joint action. That failed because one State or another would declare itself free from the disease whereas it was not; the others would be blocked by such negligence. Hence appeals came to Washington, but that brought up a complex constitutional problem, for many did not think it at all proper for the Federal Government to deal with the production and shipment of livestock. Congress was urged not to create another army of jobholders, and the bill to establish a Bureau of Animal Industry was dubbed "the horse doctor bill."

The \$10,000 appropriation for the study of pleuropneumonia, made in 1879, has been mentioned. The bill to establish the new bureau was approved by the Grange in 1880, and reported in the House Committee on Agriculture in 1882. In November 1883 Commissioner Loring called a convention of livestock breeders which urged favorable action by Congress.

EXTENSION OF GENERAL-WELFARE CLAUSE

The bill was introduced by William H. Hatch of Missouri and was passed. Its passage marked a notable extension in the interpretation of the general-welfare clause of the Constitution. It was an instance of a problem that actually transcended the capacities of the States, and individual freedom had to be restricted by the Federal Government for the public good. It should be added that the Bureau of Animal Industry was a great success.

The Bureau stamped out contagious pleuropneumonia in 5 years, a world record for its control and a tremendous boon for livestock men. The total cost of this work was \$1,509,100—a little less than the estimated annual loss in export value of cattle to Great Britain alone had the disease continued. The Bureau thereafter performed a long line of outstanding scientific research on hog cholera, hookworm, bovine tuberculosis, anthrax, blackleg, cattle-tick fever, contagious abortion, and many other animal and fowl diseases. Some of the most outstanding scientists were its employees. Ultimately, when the meat-inspection act was passed, it went to this agency for enforcement.

EXPANSION OF SCIENTIFIC WORK BRINGS MONEY RETURNS

The origin and accomplishments of the Bureau of Animal Industry are given in a little detail not only to indicate how public pressure upon Congress effects expansion in departmental activities, but also to show that a scientific bureau once established produces very large monetary returns. The history of such Bureaus as Chemistry, Entomology, Plant Industry, Agricultural Engineering, and Dairying would prove the latter point quite as well.

We come now to the last Commissioner of Agriculture who was also the first Secretary of Agriculture, Norman J. Colman (1827-1911) of Missouri. He was appointed by President Cleveland to take office April 3, 1885, and his first Report is dated that year. Colman was born in New York; he taught school, studied law, and fought in the Civil War. He resolved early to publish a farm journal, and after the war he started *Colman's Rural World* in St. Louis in 1865. He was elected to the Missouri State legislature and manifested much interest in the State university and served in many agricultural organizations.

Colman was appointed because of his broad knowledge of agricultural problems and was almost certainly the most competent head the Department had up to that time. He was largely instrumental in effecting the passage of the Hatch Act which founded the State agricultural experiment stations and gave the Department its second Bureau, the Office of Experiment Stations.

Colman's first annual account indicated that Wiley and his associates were hard at work on the food-adulteration problem. In fact Colman wrote: "It is highly desirable that some general standard of purity for foods should be established and that uniform methods of examination for adulterations be agreed upon." This was a rather advanced notion for the time. Wiley's work was already showing the wide extent and the insidious character of the adulterations.

A section of Economic Ornithology was set up in the Division of Entomology in 1885. This was the beginning of the Biological Survey, though the depredations of birds and rodents had occupied departmental attention for quite a while back.

Wiley reported on honey adulterations. Great increases in the sale of counterfeit butter were mentioned, and it was hoped that Congress would set a legal butter standard to rule out the surreptitious use of animal and vegetable fats other than butterfat. The Bureau of Animal Industry hereafter published its own long Report. Articles on farming in India and on truck farms also appeared in the 1885 volume.

In 1886 Colman remarked that American agriculture was becoming colossal. By this time nine States had established agricultural experiment stations on their own and a bill had already been drawn to provide them with Federal grants-in-aid. One of Wiley's assistants, Clifford Richardson, reported on adulterants of spices and condiments, and Colman pointed out that many countries had official analysts regularly detailed to do this sort of work. The Department was reorganized, and a Mycological Section and Divisions of Pomology and of Economic Ornithology and Mammalogy were established.

In his Report for 1887 the Commissioner observed that when the Department was organized it had few employees and only three divisions. Its organic act but faintly outlined its functions. Yet, despite prejudices, hostility, and banter, it had grown and become useful. However, the salaries of its scientists and professional aides were still insufficient.

It may be said here that the Department had not up to this point been a huge success, though individual scientists like D. E. Salmon and C. V. Riley were outstanding men, and though some research of a very useful character had been performed. Its clerks and minor employees had too often been incompetent political hacks derived via the spoils system. It did not have financial support commensurate with the tasks assigned it, which was odd, for the Federal Government was in a state of continuous prosperity from the seventies until at least 1890, the average surplus running \$100,000,000 a year.

After 1880 things improved, doubtless because of the superiority of Loring and Colman to earlier heads of the Department.

A main difficulty was lack of well-coordinated facilities within individual States to cope with diverse topographical and climatic conditions. The Morrill Land-Grant College Act of 1862 gradually helped because it gave impetus to agricultural research in the States and to agricultural education. By 1886 the field was well prepared for some national agency to coordinate the work of the existing State experiment stations, and Federal aid for them was increasingly demanded.

AFFILIATION WITH AGRICULTURAL COLLEGES AND EXPERIMENT STATIONS

Largely through Colman's interest a meeting was held in 1883 to consider the establishment of State experiment stations with Federal aid and a permanent organization was effected at the third meeting in 1887—the Association of American Agricultural Colleges and Experiment Stations. The agricultural societies, especially the Grange, and similar agencies, clamored for action. On March 2, 1887 the Hatch Bill was passed establishing the first national system of agricultural experiment stations in the world and setting up the Office of Experiment Stations in the Department of Agriculture to coordinate their efforts. This authorization of combined Federal and State work naturally required some departmental reorganization.

W. O. Atwater was made Chief of the Office of Experiment Stations and A. C. True was associated with him. The Department was to act in an advisory capacity, to furnish forms for the tabulation of results, to indicate fruitful lines of inquiry, to coordinate and prevent duplication of effort, and to give such expert advice and assistance as the stations required. Director Atwater hereafter submitted Reports for his unit, as did each later Bureau when it was established.

At this time the Bureau of Animal Industry had almost stamped out contagious pleuropneumonia. Food adulterations alarmed Colman, however, and the results of chemical investigations appeared as *Bulletin 13*, the publication of which was announced. The fraud was mainly financial, but for that very reason Colman felt it was of basic agricultural importance, as it involved passing off the less for the more valuable. Farmers were also demanding better transportation facilities as an aid to marketing; better road construction received prominent mention in the *Report* for the first time. B. T. Galloway had become chief of the Section of Vegetable Pathology. The final article in the book concerned ostrich farming in America.

AGRARIAN PRESSURES HAVE EFFECT

The United States Census of 1890 reported that "there can hardly be said to be a frontier line," and the date is usually selected as marking the end of the era when good, free land was generally open to agricultural settlement. This factor among others led farmers to seek new types of information and service. Thus the Farmers' Alliance and later the Populists wanted the Government to grade and store farm commodities in public warehouses and to make loans to farmers upon produce so deposited.

Agriculture was becoming increasingly mechanized and commercialized. Hard money, high freight rates, trusts, and monopoly were dominant issues. The Interstate Commerce Act itself had been passed mainly in response to agrarian pressure for lower railroad rates. Carriers and middlemen absorbed too much farmer profit altogether. In 1890 the matter of agricultural overproduction was already serious.

Yet the Department's sole remedy was to evolve scientific methods which further increased production or else decreased unit costs of production. Farmers intensified their efforts and made their land yield just as much as possible, yet they did not always prosper. Scientifically approved cultural practices, the prevention of damage by diseases and insects, the selection of the best varieties and breeds of plants and animals—all were important yet insufficient. With the frontier closed it was also impossible to move on to richer land and gain new hope when the old farm seemed exhausted.

The Department could do nothing further unless authorized by Congress which alone could legislate on the basic problems confronting agriculture. The prices of farm produce dropped. In 1889 Kansas farmers burned their corn for fuel, and a Nebraskan was said to have shot his hogs because he could not even give them away. Industrial prices rose. Town workers were undernourished and farmers raised more food than they could market. The problem was to aid distribution. The Farmers' Alliance and the Populist Party became increasingly influential.

MARKETING MATTERS DEMAND ATTENTION

Congress sincerely sympathized with the lot of the farmer but did not attempt at once to broaden the scope of departmental functions after the Department had succeeded only too well in making those two blades of grass grow where one grew before. Nor did the farmer wish only the increased protection from the forces of nature which the Department could offer him. He wanted protection in the market place as well. In the eighties there were floods of petitions to improve the Department's status and give it Cabinet rank. Congress was impressed by the farmer's desire.

Discontent was rife with the work of the Department. It had had scant praise in its career so far. The press, even the farm press, tended to be silent about it, except to note routine changes in its operations and personnel, and occasionally to clamor against free seed distribution. The Department had tended to serve special agricultural groups and interests—now the livestock people, now the beet people. It had not sought to understand farmers' economic problems and to serve agriculture in general. The farmers could not well apply the knowledge they received in the form in which they received it. That was a gap the Extension Service filled a decade or so later. Congress must give the Department scope for educational, economic, and social as well as scientific functions.

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EMPHATIC AGITATION FOR CABINET RANK SUCCEEDS

The 50th Congress (December 5, 1887-March 3, 1889) was simply deluged with petitions and memorials asking that the Department be given Cabinet rank. This was not altogether new agitation; it had gone on periodically for 30 years. Bills had even been introduced and occasionally passed by the House of Representatives to give The Department Cabinet rank. Again the question of including industry in the Department came up, but it was dropped. Finally the Hatch Bill was passed and signed. Commissioner Colman was nominated and on February 13 confirmed as the first Secretary of Agriculture. The sources of lawmaking are very clear in this instance. Congress created the Department of Agriculture because of the hard effort, ceaseless agitation, and widespread expression of views by those who favored such legislation.

Colman left office with Cleveland. The incoming President Harrison appointed Jeremiah M. Rusk (1830-93), and he assumed office on March 7, 1889. Rusk had been born on a farm in Ohio, but in 1853 he went to Wisconsin to keep a tavern. This venture was a success so he started a stage line which was also profitable, and in good time he became Governor of Wisconsin. His period as Secretary of Agriculture was marked by the eradication of destructive cattle diseases, and the passage of legislation for the inspection of meat. Rusk's particular contribution was his recognition of the importance of publicity and his ability to engage the interest of the press in departmental activities.

REORGANIZATION AND EXPANSION FOLLOW

Secretary Rusk promptly reorganized the Department. He retained direction of the executive work himself and placed the scientific work under the Assistant Secretary provided by Congress. He set up a Division of Records and Editing and urged the frequent publication of the results of scientific work in clear language that practical farmers could readily understand. The publication of *Farmers' Bulletins* therefore began.

Rusk also began a systematic investigation of foreign markets for American farm products. He indicated that our farm exports were not so profitable as they once were. During his administration American inspectors were stationed in Great Britain to inspect cattle coming in from the United States, and cattle-tick fever was controlled.

Rusk's first Report was dated October 26, 1889. He described the overcrowding in the departmental building as follows:

I found clerks crowded into rooms and subject to discomforts and inconveniences. I have found two branches of two distinct divisions crowded into one small room; records and books lying about upon tables and chairs for want of sufficient wall space to accommodate cases for their proper care and preservation;

the chemical laboratory crowded into a damp, illy ventilated, and wholly unsuitable basement, originally intended no doubt for storage purposes, and its work in certain investigations restricted because of the offensive fumes from such analyses, and because of the dangers to human life and limb from explosions of gases and other causes; and, in a word, there was a complete want of that systematic and orderly conduct of the public business which ought to obtain in every well-conducted office.

The Secretary then commented on the vastly larger sums spent on agricultural investigations by the governments of Great Britain, Germany, France, Russia, and even Brazil, than by our own. He expressed his determination to have bulletins printed promptly saying, "Time and expense, ability and experience, lavished on the work of this Department can have no practical results unless we can lay their conclusions promptly before the people who need them."

PROMPT AND FREQUENT PUBLICATION PLANNED

Bulletins must be gotten out frequently and promptly; the material should not wait to be printed in the all-too-crowded *Annual Reports*. There should also be both scientific and popular publications, the latter in very plain language, so that they could easily be understood by laymen. More effective distribution methods must be devised. Consequently advance sheets were prepared for the press.

The Department of Agriculture consisted of the following branches in 1889:

Division of Statistics; Division of Entomology; Division of Chemistry; Section of Silk Culture; Botanical Division; Section of Vegetable Pathology; Division of Economic Ornithology and Mammalogy; Division of Microscopy; Office of Experiment Stations; Forestry Division; Division of Gardens, Grounds, and Horticulture; Seed Division; Division of Pomology; Folding Room; Library; Museum; Bureau of Animal Industry.

A glance indicates that several independent units should have been gathered together, but this was not done till after the turn of the century.

A manifestation of the growing importance of the Department was the quantity of letters it received. Between January 1 and October 1, 1889, the number of incoming letters totaled 39,906. Secretary Rusk declared that they came "from all sections of the country, from all classes and conditions."

It was the Secretary's conviction that 30,000,000 people were directly dependent on the farm. Agriculture, he held, underlay trade, commerce, and expansion of transportation facilities, so that the productivity, wealth, and prosperity of the Nation hinged on the farmers. Science, properly directed, would help to increase production per acre by 50 percent. "The great nations of Europe strain every effort to make science the hand-maid of war; let it be the glory of the great American people to make science the hand-maid of agriculture." So Rusk wrote.

Rusk was responsible for the next three *Reports*, 1890-92. In the volume for 1890 the heads of the various units mentioned above each had his individual report. The importance of editing and publishing was again emphasized, George William Hill having been appointed to supervise this work. In 1890 also, Senator Morrill's bill making annual monetary grants of Federal funds to the land-grant colleges was passed.

In 1891 the Weather Bureau became the Department's third unit of bureau status. It had been transferred from the War Department, because the public considered that civilian control would make it more useful to agriculture, commerce, shipping, and industry. Since the Department had long carried on meteorological work the transfer was appropriate.

BROAD GENERAL POLICY UNDER DISCUSSION

In his 1891 Report Rusk launched upon a discussion of agriculture in broad, general terms—the sort of general-policy approach that has been utilized by many of his successors. At this time special agents of the Department were studying fibers, artesian wells, and irrigation problems. The inspection of animal food products under the act of March 3, 1891 had begun, and Rusk wrote that "A system of inspection for all articles of food is extremely desirable." He cited milk as a specific example. Marketing and the disposal of surplus crops were discussed, also the problem of the middleman, crop diversification, cooperatives, and the relation of farmers to the Department. Wiley was engaged in studies of Florida muck lands, adulterants of butter, tea, coffee, and cocoa, and meat preservatives.

In 1892 Rusk writing a bit less broadly advocated reduction in cotton acreage, lamented the low salaries of departmental employees, and then viewed his term in retrospect. He commented on future organizational problems of the Department, saying that entirely too many heads of separate branches now had to consult the Secretary in person. He suggested that a bureau system be adopted, the various lines of work thus being grouped together appropriately under responsible heads. This was done in 1901.

Cleveland, returning to the Presidency, appointed J. Sterling Morton (1832-1902) Secretary of Agriculture, and the latter assumed his post March 7, 1893. He was born in New York and enjoyed the distinction of having been expelled from the University of Michigan for his independence. He had located in Nebraska City where he became a politician and editor of a newspaper. Horton had long been a student of agriculture, and had owned, lived on, and worked a Nebraska quarter-section. He had a passion for tree planting and became the founder of Arbor Day. As Secretary he emphasized economy and so objected to free seed distribution that he actually put a stop to it at one time.

Morton established the Division of Publications. He reorganized the Division of Statistics and set up the Division of Agrostology to study forage plants. During his term also the Division of Soils was established in the Weather Bureau. Morton abolished the Division of Microscopy, scattering its work elsewhere, and set up the Office of Road Inquiry. A Dairy Division was organized in the Bureau of Animal Industry on July 1, 1895.

IMPROVED CIVIL SERVICE URGED BY SECRETARY

Reporting for 1893, the secretary advocated better departmental organization and gave some information about foreign agricultural departments. He said that the classified civil service was defective because there was too much injustice in rank and pay. He asserted that the Department needed more room, preferably a better building. Editor Hill meanwhile advocated a systematic classification of Department publications and pointed out the evils attendant on their unrestricted free distribution.

In 1894 Morton's main subject was the necessity for improving foreign markets. There had been a panic in 1893, and when the Wilson-Gorman tariff of 1894 was passed the President denounced its only slightly lowered rates as an example of "party perfidy and dishonor." The average annual value of our farm exports was \$752,120,000, and they constituted 66.4 percent of all our exports between 1895 and 1900.

SOILS AND NUTRITION STUDIED SCIENTIFICALLY

In 1894 Milton Whitney had undertaken the study of soils in the Weather Bureau. Congress had made a special appropriation of \$10,000 in 1893 for the study of nutrition, and Dr. Atwater was undertaking this in the Office of Experiment Stations. Wiley was hard in pursuit of food, drug, and liquor adulterations. The Office of Road Inquiry had a special Congressional grant of \$10,000, and L. O. Howard reported briefly as entomologist.

Secretary Morton commented that the act creating the Department had provided it with no building. The main structure erected in 1867 to accommodate 50 people in 4 divisions was now far too small. To be sure a museum building had been put up for \$10,000—"A better building to burn could not be invented or constructed, and yet it contains a Museum which, on the market, is worth at least one hundred thousand dollars (\$100,000)."

The Federal Government was now paying \$700,000 a year to the State agricultural experiment stations, yet it supervised this huge project from an office costing only \$25,000. Records of research that cost \$5,000,000 were stored in a combustible building, and other wooden firetraps housed investigations in the field of forestry, and so on. Scientific work had spread out in rented offices, and the Weather Bureau was so remote the Secretary could scarcely hope to supervise it at all. Finally Morton held that all departmental employees should be appointed only after passing rigidly competitive civil service examinations.

The formation of the Dairy Division and its initial operation were described in Morton's 1895 Report. Henry E. Alvord was its first chief. The foreign meat market was discussed, Atwater was stated to be well along in his nutrition studies, and unscrupulous manufacturers were said to be making perverted use of departmental analyses of their products in their advertisements. Morton would have them know that while the Department analyzed it did not commend products.

The Division of Agrostology was now fully established under an act of Congress. Milton Whitney had established a Soil Division in the Weather Bureau. Civil Service status had been extended to the Department's 2,019 employees by Presidential order dated May 24, 1895; this included all of them except the Presidential employees and common laborers. The Department now had 429 female employees.

In his final statement, that for 1896, Morton recorded that the Department's annual appropriation was \$2,583,750. The classified service had now been extended to every important position and there were 2,497 employees. Only the Secretary, the Assistant Secretary, the Secretary's private secretary, and the Chief of the Weather Bureau were non-civil-service employees. Morton thought it would be well to have a permanent Director of Scientific Work to attain better continuity of policy in such work than could be achieved under rapidly changing Assistant Secretaries.

DEPARTMENT PROTESTS FREE SEED DISTRIBUTION

The Secretary consistently operated the Department economically and turned money back to the Treasury. He was very hostile to seed distribution and insisted it be abolished. Seeds to the amount of two million dollars in retail value had been sent out in competition with those sold by retail seedsmen. Later the seedsmen were given the business of making the distribution themselves which mollified them. Morton had actually tried to stop seed distribution by injunction. This was denied him. He wrote:

. . . and thus the great privilege of gratuitously furnishing garden and flower seeds to a small per cent of the people out of money raised from the revenues of all the people was conserved to Members of Congress and officers of the Department of Agriculture. It is estimated that the distribution for this year will be sufficient to plant about 230 square miles of ground, and will therefore employ in the distribution about 60 mail cars.

The Secretary of Agriculture sincerely regrets this unnecessary and wasteful expenditure of public moneys, and hopes that Congress may in good time put a stop thereto. [Congress did—a quarter of a century later.]

LOW PAY OF STAFF PROTESTED

The Secretary gave the average age of the chiefs of his scientific bureaus as 42 years and 3 months, the oldest being 51 and the youngest 29. He said that their salaries of \$2,500 and the \$1,800 paid their first assistants were insufficient. Even the directors of the State experiment stations received more. Turn-over was high because the scientific staff was underpaid.

The Report contained a good deal about the export market for animals and vegetables. A Section of Foreign Markets was set up March 20, 1894. It was also realized that farmers needed more economic information, for production methods had now been greatly improved and agricultural resources so greatly expanded that the disposal of agricultural surpluses offered a problem. The importance of this problem increased rapidly as time passed.

The general estate of the farmer was reported good. Seventy-two out of each 100 farmers held their farms free of encumbrance, according to the Secretary, hence they were not governmental wards to get annuities like the Indians. They were co-partners with the elements. Expansion of the foreign market was urgent because millions depended upon it.

During the year 6,561,700 copies of departmental publications had been issued at a cost of \$42,340 for editing and \$130,400 for printing. A Division of Accounts and Disbursements had been set up. Wiley wanted more chemists, better pay for them, and a better building. At this point Secretary Morton left office and James Wilson of Iowa was appointed his successor by President McKinley, taking office March 7, 1897.

Secretary Wilson (1836-1920) was born in Ayrshire, Scotland; he came to the United States in 1851 and chose farming as his life work. He early became a community leader in Tama County, Iowa, was elected to the legislature and also served three terms in Congress. In 1891 he was made professor of agriculture and head of the experiment station in Iowa State College. Henry Wallace, father of Henry C. and grandfather of Henry A., suggested his name to President McKinley for Secretary of Agriculture. Wilson continued in office for 16 years, remaining under Presidents Theodore Roosevelt and William H. Taft.

TURN OF CENTURY SEES GREAT ADVANCE

Farm demonstration and cooperative extension work were undertaken during Secretary Wilson's term and a small army of experts and scientists was employed. The Department grew into a magnificent research, regulatory, educational, and custodial institution, each manifestation of growth representing an effort to provide the services demanded by the public and authorized by Congress. Not only did research in the natural sciences attain very high quality under Secretary Wilson, but social and economic studies advanced rapidly. In his annual discussions of policy, however, the Secretary inclined to ignore certain insidious factors which menaced the astounding agricultural prosperity he always delighted to herald. His successors sought to deal adequately with these newer problems.

URBAN INFLUENCES ON RURAL LIFE INTENSIFY

While James Wilson held office, urban influences on rural life rapidly intensified. Means of transportation and communication vastly improved. The increasing manufacture of automobiles and the improvement of roads gave farmers new access to markets. Competition grew keener and farm credit became an acute problem. The number of peoples engaged in farming grew steadily less. In 1910, only 33.2 percent of all persons gainfully employed were in agriculture, and the estimated average equity of farm operators in the land they tilled was 50 percent.

FOSTERING INTRODUCTION OF FOREIGN SEEDS AND PLANTS

In his first Annual Report, that for 1897, Secretary Wilson announced the appointment of a scientist to travel about the world and to supervise the introduction of foreign plants and seeds. This scientist was David Fairchild, and the agricultural industry owes to his work an added annual income of something like \$100,000,000. In *The World Was My Garden* Fairchild describes his life work.

Secretary Wilson also discussed butter exports, improvement in farm homes, the necessity for studies in home economics, and the fact that departmental publications were inadequate to supply demands. He would restrict seed distribution to foreign seeds only. He announced no new broad policies. The individual bureau reports, which hereafter filled the rest of the annual book in lieu of the items of agricultural information that formerly filled it, were concise. There was now a Division of Biological Survey under C. Hart Merriam, Atwater's nutrition work continued, and there were altogether 2,443 employees in the Department.

In 1898 the Department consisted of the following:

The Weather Bureau; the Bureau of Animal Industry; the Division of Gardens and Grounds; the Division of Chemistry; the Division of Entomology; the Division of Statistics; the Division of Botany; the Division of Accounts and Disbursements; the Division of Forestry; Biological Survey; the Division of

Pomology; the Division of Vegetable Physiology and Pathology; the Office of Experiment Stations; the Office of Fiber Investigations; the Division of Publications; the Office of Road Inquiry; the Division of Agrostology; the Division of Soils; the Section of Foreign Markets; the Division of Seed Distribution; the Library; the Museum.

The volume for this year discussed the exportation of dairy products and nature teaching in the public schools. The Secretary also suggested that the Department facilities be used for postgraduate study and A. F. Woods, at a much later date head of the Department of Agriculture Graduate School, was listed as acting chief of the Division of Vegetable Physiology and Pathology.

In his Report for 1899 Wilson started the custom of beginning with brief items summarizing the year's outstanding accomplishments. Atwater now had a flow of nutrition bulletins appearing, and Wiley reported on food preservatives. N. E. Hansen, M. A. Carleton, Walter T. Swingle, and David Fairchild were mentioned as plant explorers.

At the turn of the century in 1900 Secretary Wilson expressed his determination of bringing scientists to the aid of farm producers, and to this end 21,000,000 copies of departmental publications had been distributed. The employees of the Division of Chemistry were now cooperating with the Pure Food Congress and were seeking to prepare a law to control food adulterations. A Section of Seed and Plant Introduction had been set up, and the Division of Vegetable Physiology and Pathology now had five sections. Tea production again received considerable discussion. It was stated that Atwater's nutrition work interested producers as well as consumers of food. Better laboratories were needed however, and it proved difficult to hold scientific men on the low pay given them.

ANOTHER REORGANIZATION STRENGTHENS DEPARTMENT

In 1901 the Secretary effected the long-needed reorganization of related departmental units into bureaus. The Bureaus of Plant Industry, Chemistry, Forestry, and Soils were created with chiefs at \$5,000 each. B. T. Galloway became the first head of the Bureau of Plant Industry and Harvey W. Wiley headed the Bureau of Chemistry. Milton Whitney became chief of the Bureau of Soils which took over all work on soil surveys, soil analysis, soil technology, and drainage investigations. Gifford Pinchot was made Forester.

The Office of Irrigation Investigations now began to study agricultural engineering problems, such work having previously been done on a small scale in the Office of Experiment Stations. The Weather Bureau was trying to destroy hailstorms by firing canon at them but found the idea to be a delusion. Each unit needed more money, space, employees, and equipment. Each desired to have a series of publications all its own.

In 1902 Secretary Wilson regretted having had to pay \$21,700 a year rent on buildings and again requested a new structure to house the Department. Seedsmen had now been mollified by being permitted to cooperate with the Department in effecting Congressional seed distribution. Secretary Wilson's report was long, largely because he sought to do justice to the accomplishments of each bureau.

FARM DEMONSTRATION EXPERIMENTS BEGIN

In this *Report* for 1902 we find first mention of the farm-demonstration experiments undertaken to show the value of using scientific cultivation methods on selected "demonstration" farms in various communities. This novel and important idea originated with Seaman A. Knapp of the Bureau of Plant Industry. Ultimately the Extension Service was organized to carry adult education in agriculture right to farmers on their own farms. At that time, though, agricultural editors and farmer's institutes were pioneering in the work that later became an organized governmental activity.

By 1903 the Department was acting in part as a postgraduate institution for training young scientists, 496 having received such training so far. Surplus production presented problems, but Secretary Wilson thought increased exports would solve it. Wiley was preparing to enforce the new import food law enacted March 3, 1903. Congress had appropriated \$1,500,000 for a new building. The Weather Bureau started its work at Mt. Weather to study the laws of cosmic physics, using balloons and kites. "One thing is certain," commented the Secretary, "that the founding of such a research institution is the true scientific way to provide for the future, in assurance that the natural difficulties will finally yield to human persistency and intelligence."

The appearance of the cotton boll weevil speeded Dr. Knapp's farm-demonstration work, for the weevil produced a crisis in cotton production. Texas especially appealed loudly for Federal aid. At one huge mass meeting in Dallas half a million dollars was demanded to fight the weevil. The farm-demonstration method proved an ideal means of instruction. Dr. Knapp also won praise for the 250,000 acres of rice growing in Texas from varieties he had introduced. Dr. Wiley was seeking candidates for his famous "poison squad" to test the effects on human health of various preservatives and coloring agents currently used in food.

In 1904 Secretary Wilson made reference to farmers as our greatest source of natural wealth and said that well-being was generally diffused among them. The Bureau of Entomology with L. O. Howard at its head had been established in accord with recommendations made the year before. It was aiding the rapid spread of farm-demonstration work to cope with the boll weevil. The Weather Bureau announced that it would interpret "the language of the sun" at Mt. Weather. Dr. Wiley was inspecting imported foods and supervising his poison squad. Knapp was directing farmers' cooperative demonstration work from Houston, and the cooperation of 5,000 farmers was assured. On July 1, 1904 the Department had 4,504 employees.

FARMERS' WELL-BEING ADVERTISED

In 1905 Secretary Wilson made the unsurpassed prosperity of the times his keynote. The farmer's wealth and well-being had improved still more. Farmers supported manufacturers and even became bankers; they produced and flourished mightily. But even then, our export trade in farm products was dwindling and we were in urgent need of basic studies in agricultural economics.

The Bureau of Animal Industry was now studying the nutrition of farm animals and investigating dairy problems. On February 1, 1905 custody of the national forests was transferred to the Department and fused with its Bureau of Forestry to form the

Forest Service. The Bureau of Chemistry reported that it had lost many employees due to the low salaries paid. It was studying food poisons and standards and cooperating with the Postoffice Department in protecting the mails from makers of fake remedies. The Bureau of Statistics had considerably improved its crop reporting, and the Office of Road Inquiry became the Office of Public Roads.

FARM PRACTICES SCRUTINIZED

The Bureau of Plant Industry was reorganized in 1905. Studies of farm practice were given more emphasis, and the use of object-lesson farms was extended. W. J. Spillman sent out his first field agent, A. B. Ross. Clyde W. Warburton was now a district supervisor in this work. The Report stated that Department functions had outgrown facilities, staff, and quarters. It was suggested that the Division of Publications be given bureau status. Wiley had now found many abuses in the patent medicine field and urged rigid control of dangerous, habit-forming drugs. It was realized that the buildings now under construction could not possibly house the Department and at least \$1,500,000 more would be needed to do that.

In 1906 the Department reported an annual appropriation of \$7,175,690. There were 1,594 employees in Washington and 4,648 in the field. The new East and West Wings of the present Administration Building were nearly complete but by no means large enough. The farmer was producing and selling well but still greater farm production loomed. However, Wilson thought the farmer would not fail the public if it did not fail him. The farmer needed more education for the new era and his living standards could be improved, but his outlook was very promising.

Secretary Wilson continued this theme in the panic year, 1907. Crops had brought high returns. "The farmer has received much for which to be thankful," wrote the Secretary.

It was hoped that the new buildings would be occupied soon. The Weather Bureau reported destruction by fire of its main building at Mt. Weather. The Bureau of Plant Industry now carried on Congressional seed distribution, and Dr. Knapp continued his demonstration farms and farm meetings with success. The General Education Board had found this work so important that it supplied funds to support it and to defray the expenses of extending it in new southern States, ultimately putting over \$600,000 a year into the plan. It was now referred to as "extension work."

Dr. Wiley had helped in effecting the passage of his Food and Drug Law on June 30, 1906 and the Bureau of Chemistry was charged with its enforcement. A force of chemists and inspectors had to be appointed, and before long the number of employees in the Bureau of Chemistry was doubled.

In 1908 Secretary Wilson reported that the farmer had piled up billions upon billions of wealth and deserved a happy Thanksgiving. The Department now had so many new laws to enforce that it became necessary to reorganize its legal work. There were 10,420 employees in its 9 bureaus now.

Agricultural science had enormously increased production, but this increase was accompanied by a reduction in farm exports and a diminishing rate of population growth. However, farmers could always provide sufficient food for our population, so

the Secretary seemed satisfied with conditions. He praised farmer cooperatives as well as the rapid extension of the Farmers Cooperative Demonstration Work. There were now 157 field agents and 32,000 demonstration farms. The General Education Board wholly supported the eastern or "extension division" of this work.

COUNTRY LIFE COMMISSION A LANDMARK

President Theodore Roosevelt appointed his Country Life Commission in 1908. The Commission held 30 hearings throughout the nation. In various ways it sought aid from over 100,000 persons. Dr. L. H. Bailey of New York was its chairman. The other members were Henry Wallace of Iowa; Walter Hines Page, who later became war-time ambassador to Great Britain; Gifford Pinchot, the great Forester and later Governor of Pennsylvania; and Dr. Kenyon L. Butterfield of Massachusetts Agricultural College.

The Commission held that a new race of teachers should appear in the country and that a new rural clergy be trained. It suggested increased farmer cooperation, the promotion of rural social advantages, and the expanding of efforts to make country life more "gainful" and more rewarding. It recommended that inventory be taken of our rural resources from the soil up, that a united campaign be instituted for rural progress, and that the extension work be organized on a national basis through the State colleges of agriculture.

FARM ECONOMICS ENGAGES ATTENTION

It was in 1908 as well that serious study of farm economics was undertaken in the Bureau of Plant Industry with W. A. Peek in charge. The subjects of investigation were farm accounts, farm records, and the economic value of using farm equipment. The Bureau of Chemistry was enforcing the Food and Drug Law and Walter G. Campbell had been appointed its chief inspector.

In 1909 the Secretary noted the food and drug work in passing but wrote: "'Adulteration' is an ugly word in the popular mind." He appeared to admonish Wiley by saying that the law must not be made an instrument of repression. Wilson appointed a Referee Board of Consulting Scientific Experts and Wiley sulked. Should benzoate of soda and sulphur dioxide be used as food preservatives, even in minute quantities? That was the question.

By this time the Department was enforcing food, game, drug, bird, livestock, quarantine, and meat-inspection laws, and many others besides. Its work had had to expand constantly, as Congress passed new laws and charged the Department with their enforcement. A Trade Wastes Laboratory had been set up in the Bureau of Chemistry. This was the bud of the research on agricultural culls, byproducts, surpluses, and uses of farm commodities that has since flowered in the Bureau of Agricultural Chemistry and Engineering.

AGRICULTURAL PRODUCTION ANNOUNCED AS AT PEAK

In the same report Secretary Wilson said that agricultural production had attained the highest point yet and that this "must add much to the prosperity of farmers." He pointed especially to the rising prices of meats and farm products.

The first subhead in Secretary Wilson's Report for 1910 was: "Prosperity Maintained." He delved little into theory but stuck to factual records of progress and production. To be sure the consumer was paying more for things now, but the farmer should not be blamed for that; he was not getting an exorbitant price for any of his products. Possibly the trouble was with distribution. Yields do rise under scientific production methods. Secretary Wilson then abruptly changed the subject and turned to discuss the advisability of establishing a Bureau of Public Health. If one were created he thought it should be in his Department.

The 1911 volume comprised nearly a thousand pages. There had been short crops, but prices were maintained well, and the trade balance favored exports. The economic results of using cold-storage methods had been studied and departmental business methods had been improved. The Department had 2,514 employees in Washington and 10,190 outside.

Farm cooperative demonstration work was widespread now seven years after its inception, and farm children also were being organized in clubs. Farm economic studies continued in the Bureau of Plant Industry where "farm problem or extension work" began. Trained men were being sent out as teachers. W. J. Spillman spread this farm demonstration work to the North and West; in 1911 he helped establish the first Farm Bureau. Bradford Knapp, son of Seaman A., carried on the farm cooperative demonstration work in the South.

The book containing Secretary Wilson's final Report, the one for 1912, exceeded eleven hundred pages. It opened as usual with brief comments on bureau activities and crop yields. A rather broad study of agricultural credit conditions was now being carried on in a number of communities, for it was becoming apparent that better farm credit facilities were urgent.

The Weather Bureau was about to conclude its work at Mt. Weather. Work was being done on the standardization and grading of grain while the Bureau of Statistics was carrying on extensive studies in farm economics. Dr. Wiley had resigned. His Bureau had grown from 20 employees in 1897 to 500 and was housed in its own 6-story building now. Divisions of Production and Distribution and of Research and Reference were mentioned, and a study of the purchasing power of farm products had been undertaken in the Bureau of Statistics.

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DYNAMIC ERA IN THE DEPARTMENT, 1913-1925

It may truthfully be said that when Secretary Wilson left office with President Taft, a definite era in the history of the Department of Agriculture ended. The incoming President Woodrow Wilson appointed the historian, economist, financier, and former college president, David F. Houston, Secretary of Agriculture. The appointment was an appropriate one at this juncture of the Nation's agricultural affairs.

Secretary Houston had received a master's degree in government at Harvard. He taught at the University of Texas after which he became president of the land-grant college of that State. From this post he went to the chancellorship of Washington University, St. Louis, and thence to the Cabinet. He served from March 6, 1913 until February 1, 1920, when he resigned and became Secretary of the Treasury.

From this point on it will be impossible to write at all definitively. For one thing the Department's functions and agencies grew and expanded so rapidly under the new recognition of agricultural economic forces and public pressure for additional aid to agriculture that it would be impossible even to mention all the significant details in a brief history. For another, the past quarter-century or so may be regarded as recent and information regarding the Department's growth during this time is readily accessible.

Although it is true that a new era, a turning point came with Secretary Houston - just as another did with Henry A. Wallace 20 years later - it must not be supposed that departmental policy broke with all tradition and abruptly changed in either case. It did not. In both instances there had been emerging issues which were fully understood by some members of the Department's professional staff, but Congress had not yet passed the legislation that could alone bring the Department fully into action regarding these issues.

In general it may be said that Secretary Houston ushered in a period when the Department devoted much more attention than before to broad social and economic issues affecting farmers. As he said in his Report for 1913: "We have unmistakably reached the period where we must think and plan." Nevertheless study of the evolution of agricultural policies indicates marked continuity throughout. When changes occur the new will be found to have its roots fixed firmly in the old - in some research or fact-finding investigation that went on much earlier.

SOCIAL AND ECONOMIC STUDIES AND ACTION TO THE FORE

In reviewing Secretary Wilson's 16 years we have found that some attention had already been given to marketing and farm credit and that agricultural economics was on the way in as a subject of investigation. O. E. Baker, for instance, had been appointed to Spillman's staff in 1912, and O. C. Stine, another student of H. C. Taylor, came to join it in 1916. The grading of grain had already been approved in 1906 and of cotton in 1908.

Secretary Houston later cited the following as the most important achievements during his term: A considerable increase in agricultural appropriations; the development of information work and the creation of the Office of Information; the establishment of the Extension Service and of the Office of Markets and Rural Organization; the reorganization of the Department with attachment of the Office of Market Management and the States Relations Service to the Office of the Secretary; the passage of the Cotton Futures, Grain Standards, and Warehouse Acts; the improvement of farm credit through the Federal Reserve and Farm Loan Acts; and the passage of the Federal Aid Road Act.

Secretary Houston fully realized that the agricultural industry must be better integrated into the economy of the Nation and that a disproportionate degree of attention had been focused upon facilitating production while distribution, as well as farm living standards and rural sociology, had been neglected. His view embraced farmers as a whole rather than as individuals. He thought also in terms of distribution and consumption and the intervening price spreads, as well as of agricultural production.

Houston realized that farm-management studies could no longer be carried on effectively in the frame of reference of the Bureau of Plant Industry. He recognized the great importance of the extension work and understood that it should function more independently. He asked and acted upon the advice of such men as Thomas N. Carver of Harvard, George F. Warren of Cornell, Andrew Boss of Minnesota, H. C. Taylor of Wisconsin, James A. Foord of Massachusetts Agricultural College, John I. Falconer of Ohio State, and Richard L. Adams of the University of California. He inaugurated the "New Freedom" period which actually extended to the death of Henry C. Wallace.

Finally Secretary Houston saw the necessity for greater centralization within the Department and set up a number of staff agencies to effect integration. Originally the Department consisted largely of independent research sections and divisions which generally pursued their own ways. Later, when the bureaus appeared, they still tended to have very considerable autonomy, and unified departmental policy was difficult to define. Houston gave impetus to the setting up of institutional or staff agencies to unify the various functions of the line agencies.

MARKET INVESTIGATIONS UNIT ORGANIZED

In response to long-continued agitation and in recognition of the new emphasis on distribution in agriculture, Congress had provided for specifically, in its appropriation for 1913-14, the acquiring and diffusing among the people of the United States, useful information on subjects connected with the marketing and distribution of farm products, and made \$10,000 immediately available. To carry out the intention of Congress Secretary Houston established the Office of Markets, attached directly to his office. Under the leadership of Charles J. Brand it rapidly became one of the spearheads in the vigorous attack on economic and social problems and advanced through various organizational steps to become in a few years, one of the largest Bureaus in the Department.

In 1917 the Department had these staff agencies: The Secretary's Office, Assistant Secretary's Office, Solicitor's Office, Disbursing Office, Library, Chief Clerk's Office, Mechanical Superintendent's Office, Offices of Information, Inspection, Exhibits, Forest Appeals, Farm Management, and States Relations Service. There were, in addition, the following line agencies: Weather Bureau, Bureau of Animal Industry.

Bureau of Plant Industry, Forest Service, Bureau of Chemistry, Bureau of Soils, Bureau of Entomology, Bureau of Biological Survey, Division of Publications, Bureau of Crop Estimates, Office of Public Roads and Rural Engineering, Bureau of Markets, the Insecticide and Fungicide Board, and the Federal Horticultural Board.

Like American agriculture as a whole, the Department of Agriculture itself was changed drastically by the World War. In dollar terms agricultural production and exports mounted tremendously. New efforts were required to increase food production, reduce wastes in processing and distribution, and provide labor to replace that now in the armed services. The programs and personnel of the Bureau of Markets and the Cooperative Extension Service underwent great expansion.

The Department acquired prestige as it assumed leadership in calling conferences of agricultural interest-group associations. These groups began to think more and more in terms of governmental policy and of the services the Department could render. The National Agricultural Advisory Committee was set up officially to advise the Department and the Food Administration. In the long run there emerged tremendous readjustment problems concerned with prices, debts, land use, and soil waste. This broke in upon Houston's effort to realign the place of agriculture and the functions of the Department in the national economy.

The year 1898 was the last in which agricultural exports comprised as much as 70 percent of our total domestic exports. Thereafter the farm share of exports generally decreased even while the actual volume of all exports increased. Finally the volume of trade changed also; the turn of the century brought a decline in farm exports, and in 1910 the level was again where it had been in 1880. Europe had growing difficulty in getting goods to us in return payment. Meanwhile our own imports of raw materials for manufacturing trebled. This came largely from non-European markets.

The end result was trade unbalance. Europe therefore began to turn to other markets for raw materials and agricultural products—to Canada, the Argentine, Russia, Australia, and New Zealand. Some countries began to erect agricultural tariffs to keep out our goods. Industrialization stimulated population growth in manufacturing countries beyond their capacity to support the population by means of national agriculture. People in industrialized countries, including our own, more and more depended upon foreign trade.

American manufacturing largely grew up behind tariff walls and maintained price levels far higher than those obtainable in agriculture. Industry was thus partly exempted from the world competition which agriculture had to meet head-on. Furthermore farmers being highly individualistic producers could not well cooperate in the formulation of national policies unless some governmental agency assisted them in planning. We turn now to a brief review of the *Reports of Secretary Houston*.

The first of these, for 1913, was very compact as compared with Secretary Wilson's volumes, the entire book covering only 370 pages. After citing the necessity for planned action, the Secretary remarked that recklessness and waste had been incident to our breathless conquest of the nation, and said we had thought too little about the fundamentals of our existence. The Department had directed its attention too much to the individual farmer, while the broader aspects of rural life had received scant attention.

Now "further production waits on better distribution" and the latter offered great problems. The farmer was not getting what he should for his products, though consumers often paid high prices, and unnecessary burdens were thrown upon the distribution system. Lack of systematic planning, inefficiency, economic waste, and unfair manipulation all played a part in burdening agriculture. The Department must consider these new problems and seek solutions for them.

A drastic reorganization of the Weather Bureau was announced and the discontinuation of its work at Mt. Weather which, the Secretary said, had not been found a good place for aerial research. That fact was stated by scientists in 1903 when their advice was requested and ignored. In any case the coming of airplanes made balloon research rather archaic.

The Report proposed that the Bureau of Statistics become the Bureau of Agricultural Forecasts, and that the Food and Drug Administration cooperate more intensively with State food and drug units. It declared that new lines of work must be initiated, such as increased study of marketing problems.

HOME MANAGEMENT AND FARM WIVES RECOGNIZED

Better cotton-classification standards were needed. Co-operatives must be further encouraged. Rural credit must be studied intensively, for farmers now urgently needed long-time loans at lower interest rates. Credit conditions generally should be improved, even in the matter of short-time loans. Roads should be extended, insect pests fought more effectively, and the status of farm women improved. Hence home-management studies would be undertaken, for housewives had repeatedly designated the fields in which they required aid if farm-family living standards were to be improved. The American Home Economics Association was now getting recognition.

At this time publications were newly classified and State coordination was improved. The outline of the past year's work was brief. Secretary Houston's recommendations were that laws be passed better to convey information to farmers; that the word "drug" be more broadly defined in the food and drug law; that better cooperation be effected between Federal and State governments in highway construction matters; and that there be investigation of marketing and grading standards, credit conditions, and domestic living conditions on farms.

In 1914 the Office of Markets was assuming much enhanced importance. The Cotton Futures Act has been passed. Studies of rural credit were under way and better dissemination of information had been effected. The Smith-Lever Agricultural Extension Act was passed on May 8, 1914, and the Extension Service was being organized to carry out its provisions. It provided for the use of personal-contact teaching methods to be financed by the grants-in-aid. Formal agreements between the Department and the land-grant colleges had to be effected. The Office of Information was created.

REORGANIZATION FOR MODERN EFFECTIVENESS

The Secretary had also been directed to make a fundamental reorganization of his Department. Regulatory, research, educational, and custodial work had become inextricably mingled. The farm-demonstration work and the Office of Farm Management

were removed from the Bureau of Plant Industry. With the Office of Experiment Stations and the Extension Service they went into the new States Relations Service directed by A. C. True. Department publications were reclassified and the *Journal of Agricultural Research* was established under a committee headed by Karl F. Kellerman.

In 1915 Secretary Houston felt that agriculture as a whole had prospered and remarked that research was still basic. Extension work was growing rapidly, and animal diseases, marketing, and distribution were prominent. A market news service was being started, and a bill had been prepared to set up a rural credit system. The States Relations Service was appointing county agents, setting up county organizations, and forming clubs of rural boys and girls. National forests were stressed, and a Bureau of Crop Estimates was mentioned. There was now an Office of Home Economics in the Office of Experiment Stations, and the Office of Public Roads and Rural Engineering and the Office of Markets and Rural Organization were functioning.

By 1916 the work on marketing, finance, and rural organization mapped in earlier reports, was well under way. Acts establishing standards for staple agricultural products shipped to market, as well as the grain futures, grain standards, warehousing, and Federal farm-loan and Federal-aid road laws had all been passed. The loan act was especially designed to create a banking system tailored to rural needs.

WORLD WAR BRINGS DRASTIC CHANGES

Immediately after the European war broke out agricultural exports gradually gained. In the period 1915-20 they averaged in annual value \$2,637,853,000 and constituted 41 percent of all our exports. By 1917 Houston was stressing all efforts to increase farm production for domestic use and export. The Food Administration was started with Herbert Hoover in charge. The cooperative Extension Service sprang into new usefulness in showing farmers how to increase food production to win the war. An additional appropriation of over 4 million dollars was made to expand this work. Farmers responded vigorously, struck the plow into land hitherto untilled, and won praise for it. Home economics work, Federal and State, increased in importance under impact of war conditions.

CROP ACREAGES AND LAND VALUES REACH PEAKS

A record acreage had been planted by 1918 and crop yields had been stimulated in all practicable ways. Every agency was pushing this work. Authority was now granted to use motion pictures for purposes of agricultural education. Interest in farm land increased, land speculation got under way, and farm values shot up miraculously, tempting farmers to top-heavy mortgage indebtedness. The land-settlement problem was being studied, however, for the Department already recognized that much land was going into cultivation that should have been reserved for forests or wildlife. Rural health and sanitation were stressed and both extension and home economics work progressed further.

RESULTING PROBLEMS ARE POINTED OUT

Secretary Houston's final Report was that for 1919. The war was over. America had saved Europe temporarily. The United States now had maximum agricultural production and exports for all time, the stupendous progress of agriculture in this country being illustrated by graphs in the report. How rapidly new areas should be opened to cultivation was a question the Secretary felt merited attention. He said that we did not want to encourage too wide fluctuation in farm production, and that land settlement must be carried on intelligently. Farm tenancy was increasing. Land prices were often unjustifiably high forcing tenancy upon many farmers. A broad study of rural conditions was required.

Thus it was that Secretary Houston ushered in the second dynamic period of the Department's history. After a long period of relative futility, the first occurred; it started under Commissioner Colman and gained momentum under Secretary Rusk. A long static period supervened. Secretary Houston's dynamic period was carried over by Meredith and Henry C. Wallace, whereupon another period of consolidation took place. This ended of course when the New Deal period began under Henry A. Wallace.

The day following Secretary Houston's resignation to become Secretary of the Treasury, February 2, 1920, Edwin T. Meredith, an Iowa Farm Editor, became Secretary of Agriculture. The latter served until March 4, 1921 and made the Report for 1920 in which the farmers were still being praised for glorious war-time service. But Secretary Meredith admonished farmers that they now faced a declining market, with shrinkage of land and other values, and the Secretary admitted that there was no simple solution for this complex problem. World conditions were chaotic.

REVALUATIONS ARE IN ORDER

Obviously studies must be made of farm prices and costs as related to general price trends, production trends, intentions to plant or to breed, and demand trends. More reevaluation was in order. The first impulse of those hardest hit was to turn to Government for aid. Further work was started, therefore, in this postwar primary depression period, on marketing, the provision of foreign market information, crop estimates and livestock reporting. At the same time ways were sought to lower farm costs of production.

Farm financial problems loomed. Land-value deflation was imminent. The price of land had gone far too high as acreage had expanded abnormally and, from the long-time view, unwisely during the war. It looked as though tough times were coming for the farmers and the report warned them very realistically. In this year all departmental information work was consolidated, and Henry C. Taylor was now chief of the Office of Farm Management and Farm Economics.

In 1920, only 26.3 percent of those gainfully employed were engaged in agriculture, and the average equity of farm operators in the land they farmed was but 46 percent. The foreign market for farm products began to decline, wartime agricultural prices collapsed, and long-time agricultural depression began. Meanwhile the use of tractors on the farm advanced rapidly. In 1921 the Packers and Stockyards Act was passed and a Congressional farm bloc organized.

SURPLUSES DEMAND ATTENTION

In 1922 President Harding called an agricultural conference in Washington; the Grain Futures Act was also passed this year. The surplus became the chief agricultural problem; it was at first attacked as a marketing, later as a marketing and production problem.

On March 5, 1921 President Harding appointed Henry C. Wallace, father of Henry A. Wallace, to be Secretary of Agriculture. In his first Report, for 1921, Wallace frankly recognized the dangerous nature of the farmer's position with overexpanded acreage, inflated land values and an uncertain foreign market confronting him, and an industrial depression under way. The farmer was said to produce on faith and take great risks, and his 1920 crops were produced at the greatest cost known. Yet he had to take what he could get for them, which disproportionately reduced his income. He was producing surpluses he could not sell while there were hungry people abroad who could not buy, a situation that was soon, but most precariously, tided over by huge loans to European nations.

FARMERS' DIFFICULTIES NOW OF NATIONAL CONCERN

Transportation rates were high, like land prices and rents. The farmer faced excessive fixed charges and also found that his mortgage principal and interest did not decrease in value as did his land. Wallace said the farmers' difficulties were now a matter of national concern. The unprecedented drop in farm prices sent many farmers to the wall and forced many others to borrow. It was thought that the credit system was still ill-adapted to farmer needs. Congress had authorized the land banks to loan more freely, but this was regarded by the Secretary as symptomatic treatment for a deep-seated ailment.

Actually the World War had only temporarily saved the farmer when greatly improved scientific cultural methods, advancing technology, and a dwindling export market had threatened him. Unwise speculation in land further menaced his security, yet the very terms of his salvation tempted him to act unwisely. Now also the land, water, and forest exploitation of long generations before him came to plague the farmer in his adversity. For yet a little while insecure loans to Europe put off his evil day, but agricultural depression was really rampant throughout the so-called prosperous 1920's.

The Report for 1921 suggested the consolidation of the Bureau of Crop Estimates and Markets with the offices concerned with studies in farm management and agricultural economics to form a new unit, a Bureau of Agricultural Economics. Marketing was now seen to be an integral part of production, though scientific research was still regarded as basic, and a Director of Scientific Work was appointed. Henry C. Taylor became chief of the new Bureau of Agricultural Economics on July 1, 1922. Work in home economics was also still increasing in importance. Wallace warned that no new land should be opened to cultivation and recommended intensive, cost-lowering methods to farmers.

TIME OF RECKONING LOOMS

In 1922 he again frankly stated that farmers were still doing badly. Agricultural commodities sold at bankruptcy prices though other products were high. Hence farmer income suffered the deepest cut of all, and farmers could only live by practicing the most rigid economy. There were few hopeful prospects, though the War Finance Corporation had saved many farmers from receivership, and the farm land and joint-stock banks advanced still more on farm mortgages. A time of reckoning was bound to come.

The Packers and Stockyards Act had brought many new problems of control into the Department's field. The act was designed to establish free, open, competitive conditions. The National Agricultural Conference had been held, had debated learnedly and had adopted the customary resolutions. It was felt that governmental supervision was needed over grain exchanges and that further farm credit legislation would be desirable. Economies had been effected in the Department though the low scale of employee salaries had been increased, research continued, and a building program was under way. New seed loans had been made. The Office of Exhibits, the Fixed Nitrogen Research Laboratory, and the Packers and Stockyards Administration now each submitted separate reports.

Secretary Wallace's final Report was that for 1923 in which he stated agriculture had improved somewhat, but there was a bad wheat situation due to competition from Canada, Argentina, and Australia, all of which had increased their wheat exports. There were also far too many hogs and a price decline had ensued. Farmers were heavily in debt and they found taxes and interest difficult to raise. Many were in financial difficulties; many others had lost their farms. A drift to the cities had set in, and rural morale was in decline.

It was imperative, held Wallace, that wheat acreage be reduced and diversified cropping be instituted more widely. Or a governmental agency might be set up to buy and export wheat and other agricultural commodities of which we produced exportable surpluses. Thus we might secure for them an exchange value equal to that of prewar times. Here is the germ of the two-price system, and it directly reflected discussion among many farm pressure groups.

PARITY ASKED FOR AGRICULTURE

The Secretary continued that farm products must somehow be put on a price level with other commodities. Of course if farmers could somehow readily control their production to match market requirements, as industrialists so easily could, that would solve their problem—though of course agricultural production should not shrink so much as to menace the future. This foreshadows Henry A. Wallace's ever-normal granary.

It was hoped that studies in agricultural economics would help farmers help themselves. Meanwhile world markets had been studied and crop and livestock reports rendered more accurate than ever. There was increased demand for information regarding agricultural situations in general, so the market news service had been expanded and a radio news service undertaken. Cooperatives were being studied further.

The States Relations Service was dissolved February 26, 1923 and in its place were created the Extension Service, the Office of Experiment Stations, and the Bureau of Home Economics. The last, under Dr. Louise Stanley, embarked on a program of research in foods, textiles, and home equipment, and later of nutrition problems in their broad social aspect. The Bureau of Agricultural Economics, the Office of Motion Pictures, the Office of Exhibits, and the Administrator of the Grain Futures Act made separate Reports.

Secretary Wallace died in office on October 25, 1924, and Assistant Secretary Howard M. Gore immediately became Acting Secretary. He was appointed Secretary of Agriculture November 22, 1924 and served until March 4, 1925 when he resigned to become Governor of West Virginia. The 1924 volume was prepared under the direction of Secretary Wallace; Gore transmitted it as Acting Secretary.

The harvest was reported as excellent and the general condition of American agriculture was said to have improved. The wheat situation was reported better, cotton steady, vegetable acreage increased, and livestock bad. The foreign market was all but lost and slight hope could be entertained for its recovery. Certainly these Reports told unpalatable truths from time to time. Depression was said to have struck agriculture in a transition stage just after it had undergone a 15-percent expansion for war purposes, with all the accelerated adaptation of new equipment this implied. The postwar crisis checked all this. Prices dropped, tax delinquency increased, and bankruptcy spread. Recovery would be slow and arduous.

All departmental work in agricultural economics was now consolidated and expanded foreign-market information was being supplied. Legislative relief had been granted farmers, though credit extensions had not always been a kindness. Land resources and land-tenure conditions were undergoing study. In the future agricultural expansion must take place only on reclaimed land. Improved collateral was being made available by the storing of crops in licensed warehouses. The market-news service had been extended still further, and the statistical work had been strengthened. Inspection and standardization work progressed and the grading of grain aided growers. Cooperatives, farm-management, and farm-service work all received due attention.

The Bureau of Dairying was established by act of Congress of May 29, 1924. The dairy industry had asked for the establishment of a bureau to consolidate work in this field.

The Secretary's Report stated that one-half of the Department's appropriation was now expended for regulatory and service work such as the care of the national forests, enforcement of meat, food, and drug inspection acts, and so on. Less than one-quarter, or \$9,700,000 of the sum available for ordinary activities, was expended on research which, however, was vitally important and brought huge returns. It deserved the most liberal support for its vast contributions to public welfare.

RESEARCH RESULTS SURPRISE MANY

It almost seemed as if the departmental research workers had overreached themselves. Set to lowering the unit costs of agricultural production and to improving yields, they had succeeded so admirably as to aid in producing enormous surpluses.

Now they had to be defended, it appeared. Yet the almost incredible unearned increment of their work spilled over into many fields other than agriculture, benefiting every industry and every individual in the United States. City and country alike shared these benefits.

Now the time had come when scientists almost felt as if they should apologize for their work, and when there was a tendency to blame research for the country's ills. This was because less intelligence had been used in putting scientific knowledge into practice than had been required to develop the knowledge in the first place. We had neglected to perfect a science for the intelligent utilization of scientific knowledge. There was too little, not too much, science. We needed a great deal more social science research.

Nevertheless the work of departmental scientists and of those in the State experiment stations have greatly enriched us as a nation. Their contributions are stupendous even considered in monetary terms, but the returns are payable largely as social dividends in a generally better standard of health and living.

Outstanding scientists of the Department who are today deceased, retired, or at work elsewhere include W. O. Atwater, S. Henry Ayers, Mark Alfred Carleton, W. Mansfield Clark, O. F. Cook, Frederick V. Coville, Cooper Curtice, Marion Dorset, David G. Fairchild, Maurice C. Hall, L. O. Howard, Seaman A. Knapp, Fred L. Kilborne, William A. Orton, Brayton H. Ranson, C. V. Riley, J. E. Shillinger, Edmund C. Shorey, Erwin F. Smith, Theobald Smith, W. J. Spillman, Charles Wardell Stiles, and M. B. Waite. The list could be readily and very considerably extended, but for reasons of space this must suffice.

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PERIOD OF CONSOLIDATION IN THE DEPARTMENT, 1925-1933

The Department entered now upon another 8-year period of consolidation. That does not mean that the Department slowed down or that its direction was incompetent. Its growth has generally spurted by rather sudden stages. First there arise various pressure groups which have many different remedies in mind for emerging problems. These cannot exert effective pressure on Congress until they have achieved unity of purpose, nor can the Department go very far toward new functions required to solve emerging problems in new fields until it has Congressional authorization. Finally the pressure groups achieve sufficient unity to have Congress enact new legislation, and the Department again enters a dynamic phase to put these laws into effect.

In the period 1925-30 the average annual value of agricultural exports was still \$1,791,529,800, fortified by loans to Europe, but they constituted only 37.1 percent of all our exports. The first hybrid-seed corn company was organized in 1926 and a successful light tractor was developed, both agents to increase production. The export-debenture plan was also proposed in this year. The first McNary-Haugen bill was vetoed in 1927 and the second in 1928. In 1929 the Federal Farm Board was established. About this time panic set in.

Only 21.5 percent of all our people gainfully employed were engaged in agriculture in 1930 and the estimated average equity of farm operators in the land they farmed was only 41 percent. The latter figure dropped to 39 percent 5 years later. The agricultural export market suffered increasingly serious competition; the day of loans to Europe had passed, and our own tariff walls not only effectively shut out foreign goods but stimulated similar action on the part of other nations. The highly protective Hawley-Smoot Tariff Act was passed in 1930.

Farm labor requirements dropped rapidly in all crops. The use of hybrid-seed corn became general. Multiple-row cultivators, corn planters, and corn pickers came into wide use, and the all-purpose rubber-tired tractor with complementary machinery appeared. Soil erosion, shortage of good land, surplus rural population, and farm insecurity all became real problems.

INDUSTRIAL PROSPERITY MASKS FUNDAMENTAL CONDITIONS

On March 5, 1925, William M. Jardine, President of the Kansas State College of Agriculture, took office as Secretary of Agriculture and served until March 4, 1929. During his term ominous conditions in agriculture were somewhat masked by the spurious and highly specialized industrial and financial "prosperity." In his first Report the Secretary held that the marked improvement of 1924 had continued, however - though moderately. There was a large crop of wheat but a surplus was not feared, while large cotton crops rather allayed fear of boll-weevil destruction and there was talk of "restoration of stocks."

Agricultural exports were said to have increased. The farm-credit situation was regarded as bad, the small farmer suffered, and local agricultural credit organizations were suggested as a remedy. In some regions it was held there was actually lack of confidence in future expansion. One of the sections of the Report was entitled: "Economic Problems in Agriculture - Agricultural Surpluses." Here it was stated that agriculture simply must not be permitted to become depressed periodically by overproduction, because such surpluses were bound to be disastrous to this industry. Stabilized agriculture could not be obtained if overproduction continued.

Therefore the Department would seek to give farmers every scrap of valuable economic information it could procure. It would set up a comprehensive system of standards and grades. It would seek to have warehouse and terminal facilities rendered adequate to permit stored crops good collateral status. Then if farmers could thus be aided better to manage production, distribution, and marketing, this should go far to solve their problems.

Crop-carry-overs could then be stored to aid in adjusting production schedules. Agricultural cooperatives should be encouraged in every way for these, the farmer's own business organizations, could greatly aid him. At the same time it was suggested that efforts should be made to increase the efficiency and decrease the unit costs of farm production, without bringing any new areas into cultivation. The purchasing power of farm products was still far below war levels and must be improved.

FARMERS UNABLE TO SOLVE PROBLEMS ALONE

These were all excellent ideas. The difficulty was that the farmer could not put them into effect without the aid of Government as an over-all general-staff planning agency cooperating with him in a well-integrated democratic procedure. He was here advised to attack as an individual problems of national, in fact international scope. These problems could only be solved by closely cooperative action under governmental guidance

The Purnell Act had been passed authorizing additional grants of Federal money to the State experiment stations. The passage of this bill had been recommended by the President's agricultural conference. The increased funds were to be used for research in the economic and sociological aspects of agriculture, and the subject matter was still further widened finally to include every factor connected with the promotion of an efficient and healthy agricultural industry.

Agricultural pressure groups also recommended the passage of laws to authorize the setting up of agricultural credit corporations and for expanding livestock grazing rights in national forests. Investigations were already under way on high freight rates and farm taxes, and it was insisted that the tax load must be in part removed from farm property. The Department also saw that it must aid in the business organization, management, and operation of farm cooperatives, as well as the education of farmers in regard to them.

The Office of Personnel and Business Administration was set up in 1925 making for further departmental integration. On June 30, 1925 the Department had 20,500 employees of whom 4,800 were in Washington. Its units were widely scattered in 40 different buildings and its housing problem had again become acute.

Secretary Jardine still saw moderate improvement in agriculture in 1926, though recovery processes were not uninterrupted, and difficult problems remained before efforts to curtail production could be expected to bear fruit. Farmers were now seeking to improve the quality of their products in order to get better prices, but many of them were said to be very inefficient. Fetter adjustment of production to market requirements, with consumer interests fully safeguarded, and better marketing would, it was anticipated, dispose of the now perennial surpluses.

Cooperative marketing as well as cooperative buying power must be developed by farmers. Their cooperatives must be given accurate information and competent direction by specialists. Agriculture's fixed expenses - interest, taxes, expensive farm implements - were a burden, but the land banks had already loaned \$1,698,000,000 to ease it. Studies had proven that farmers bore a disproportionate share of the tax burden, though any sudden, drastic cut in their taxes was impossible. Freight charges must be reduced and highways improved so farmers could tap more distant markets. The farmer was said to benefit from high tariffs.

The cotton crop had been large but returns on it poor. Stocks of agricultural commodities tended to accumulate. Farmers were urged to sacrifice bulk for quality production. There was faint improvement in the foreign market. Market news, radio, press, and outlook reports had all been improved. The Purnell Act had gone into full effect July 1, 1925. The Department was to get a new building. Nelson Antrim Crawford had been appointed Director of Information by the Secretary and had organized press and publications work in that Office; radio was added in 1926.

SOLUTIONS EVIDENT BUT NOT THE MEANS

In 1927 the farm problem was still acute. The Secretary suggested that wastes be cut, production costs diminished, the margin between producer's cost and consumer's purchasing price lessened, the costs of transportation and distribution reduced, the tax burden redistributed to help reduce the farmer's overhead, and that farmers cooperate to enhance their bargaining power. What should be done was clearly seen; how to do it remained puzzling. The marked progress in technology since the war now complicated the problem. The amount of land needed to feed power animals had been reduced from 15 to 20 million acres by increased mechanization and the decreased number of horses and mules required. Technology also increased production.

Cooperative marketing had made progress, but united farmer action would be required to adjust production to demand. There were also complicating credit problems around which public responsibility for farming revolved. Taxation was increasing, but it was again stated that the high protective tariff aided the farmer.

The problem of land utilization had assumed importance. This was directly counter to the traditional trend of individual exploitation of land resources. We had more acres in cultivation now than we needed. Agriculture had overexpanded into marginal and submarginal land. Reclamation projects must be examined critically and the constant agitation for more irrigation projects heeded with caution. Worse still, land unfit for agricultural development was still being settled under homestead laws.

The rapid expansion of cotton growing in Texas and Oklahoma presented new credit problems. Many growers could afford no security for loans. Scientific research was still defended as an excellent investment of benefit to the entire public, though it was realized that further research in economics and marketing was now urgent.

The Bureau of Chemistry and Soils was created from part of the former Bureau of Chemistry and all of the old Bureau of Soils; C. A. Browne became its chief. The Food, Drug, and Insecticide Administration (later merely Food and Drug Administration) was set up to do regulatory work in this field with Walter G. Campbell at its head. Thus research and regulatory functions were divided. The Chemistry Bureau had already embarked on a far-reaching research program upon agricultural wastes, culls, byproducts, and periodic surpluses. The Insecticide and Fungicide Board merged with the Food, Drug, and Insecticide Administration June 30, 1927.

In 1928, Secretary Jardine said that agricultural prospects were bright only in spots. Cotton acreage had increased, the corn crop was large, and exports had definitely declined. National responsibility for farm welfare was stressed. After all, we had appealed to the farmer for vastly increased production to win the war, he had responded nobly, and that is what got him into trouble. He was a victim of patriotically motivated "abnormal and unbalanced expansion."

The trend towards increasing farm tenancy continued. There was a cotton carry-over problem now and prices were depressed. Could cotton be enabled to compete better with other fibers? The cattle industry, however, was said to have recovered after 6 lean years.

AGRICULTURAL RELIEF REACHES DISCUSSION STAGE

One section of the Report was headed "Agricultural Relief." It said the Government must assume the responsibility of solving agricultural problems. It suggested the creation of a Farm Board to finance and handle surpluses through central stabilization corporations, a direct reflection of the desires of certain pressure groups. The Cooperative Marketing Act of July 2, 1926 had aided marketing research, and further loans had been made available to farmers by an act passed February 25, 1927. Foreign competition was keener daily, farm taxes were as high as ever, and numerous unsolved problems existed.

The Bureau of Chemistry and Soils took over some additional work from the Bureau of Plant Industry, as well as the Fixed Nitrogen Research Laboratory. The Bureau of Animal Industry took over the Packers and Stockyards Administration. Plant Quarantine and Control Administration was formed from the Federal Horticultural Board and certain units of the Bureaus of Entomology and of Plant Industry. New buildings were to be erected, the Department's 19 units still being housed in 40 scattered buildings, with some single bureaus in occupancy of as many as 8 or 10 different structures. The returns on agricultural research were said to be immense. L. O. Howard had retired.

The cumulative pressure of agricultural problems increased continually. In 1929 general panic and depression burst on the country. Arthur M. Hyde, a former Governor of Missouri, became Secretary of Agriculture March 5, 1929 to serve until

March 4, 1933. His first Report reviewed the agricultural industry as a whole and the several crops specifically. He insisted that agricultural conditions were improving, and that the decline in farm land values had ended. He said that the farm machinery used had shown a 445-percent increase in value per farm worker between 1870 and 1925, expressed in 1913 dollars. This increased use of tractors led to larger farms - also to more tenancy. There was need for agricultural relief, Hyde admitted.

Agricultural-producer bargaining power must be strengthened through cooperatives, the supply of agricultural products stabilized, and a scientific agricultural land-use policy developed. In addition the market for agricultural products must be broadened by finding new uses for them and their byproducts, transportation maladjustments corrected, and undesirable agricultural speculation minimized as it would be under the Agricultural Marketing Act of 1929. Such measures would restore health to agriculture.

Meanwhile the Federal Farm Board had been organized. An adjunct of the Department, the Board had authority to create commodity stabilization corporations and to recognize and collaborate with farmer cooperatives. It could make loans from a half-billion-dollar revolving fund, but it had no control over production or acreage.

QUALITY PRODUCTION FURTHER EMPHASIZED

Farm taxes remained high, but the tax base had been broadened. Exports were said to have gained faintly. Quality production was again stressed. Land utilization came up for comprehensive discussion - abandonment through tax delinquency, uncertainty as to wise use, submarginal lands, the public ownership of timberland, etc. Experienced personnel would be required for action. Soil erosion, the important project of that scientific evangel Hugh H. Bennett, was discussed in a separate section. Its urgent importance was stressed and an attack upon the problem recommended. The widespread drought of 1929 was noted, also the necessity for better forest-fire fighting. C. L. Marlatt was now head of both the Bureau of Entomology and the Plant Quarantine and Control Administration.

DROUGHTS TAKE TOLL

"The 1930 Drought" was the first subhead in Secretary Hyde's Report for that year. The effects were so extended that relief would be required. The Red Cross had given aid, and Congress made emergency loans of 6 million dollars available both in 1929 and in 1930, though \$4,580,683 of the first 6 million dollars had already been repaid.

Cotton yields still mounted and something must be done about the carry-over which was too ample for normal market requirements. There had also been a wheat carry-over since 1927, which now amounted to 275 million bushels.

Mention was made of the "current slump in agricultural prices and incomes," as reflecting the effects of continued overproduction and world-wide business depression, of the burdensome surpluses, and a stock market break, not to mention a world

price decline and the smallest farm exports since 1915. Meanwhile technical progress in agriculture intensified and Canada, Argentina, and Australia were taking over our wheat-export markets. Acreage must be curtailed by eliminating high-cost-of-production acres. But how?

Farm taxes still rose yet land values fell. Both voluntary and forced sales were numerous and farm credit conditions were generally bad. Low commodity prices cut the farmer's basis for security; loan agencies now regarded him as a poor risk. Mortgage financing should be based squarely upon scientific land valuation. Rational land use really called for a scientific classification of our land resources, a diversion of tax-delinquent farmlands to other uses, a reconciliation of the reclamation policy with the necessity for restricting production, effecting reforestation, making the public-domain policy serve grazing needs, and giving accurate information to private enterprise on land settlement. Here we find the foreshadowing of many New Deal measures.

TARIFFS ARE DEBATED

The Secretary contended once again that the tariff act of 1929 aided farmers by protecting their domestic market. On June 5, 1930 Congress provided for an expansion of the foreign agricultural service. The Bureau of Dairying was now the Bureau of Dairy Industry. The Grain Futures Administration made a separate report again. M. S. Eisenhower signed a Report as Director of the Office of Information, and Lee A. Strong was in charge of the Plant Quarantine and Control Administration.

In the 1931 volume world influences were accused of depressing American agriculture which lacked a foreign market and was therefore surplus-burdened. For the war had reversed a long-time trend. It had made us a creditor instead of a debtor nation. We had overshot the "effective" European demand for our products. The extension of credit had for a time retarded an export decline, then our foreign market had vanished, and it was gone until European credit was restored. American agriculture might better adjust itself to a declining foreign market. Our surplus difficulties were really export troubles. Agriculture would positively benefit from the high tariff just as soon as we learned to quit producing for an export market that no longer existed.

Agricultural prices were said to have declined more than other prices because it was so easy for farmers to overshoot "effective" demand. Though farmers had been admonished to make crop adjustments, they tilled the greatest acreage in history in 1930. Compulsory acreage readjustment seemed inadvisable yet voluntary curtailment appeared inadequate. Somehow many farmers must agree in common cause.

The year had been disastrous for wheat, what with Canada, Argentina and Australia cutting in on our European export market. There was still extreme over-production. Of course the operations of the Federal Farm Board had helped some, but then cotton prices fell and our supply of cotton was double the world's consumption of American cotton during the past season. Livestock and dairy products were down and exports low.

RIGHT LAND UTILIZATION CALLS FOR ACTION

We must put our land to "right uses" -replan land use on a research basis, for "emergency conditions" demanded action programs. We should get farmers off poor land, promote compact rural communities, and create conditions such that land could be put to the best use for which it was adapted. We must maintain forest and range areas, discourage agricultural expansion, and promote the adjustment of land valuations. We should also develop such types of land use as will contribute to watershed protection, flood control, and the growth of forests. Farm land values still declined.

NECESSITY FOR ECONOMY ARISES

State legislatures were all trying to economize now. The 71st Congress had made 45 million dollars available for drought loans alone, out of a total authorized agricultural credit of 67 million dollars. There was much privation but Congressional appropriations already made to the Department for unemployment relief by work on public roads, highways, and in the public domain would be a help. The Biological Survey had special funds for such purposes, also.

Secretary Hyde opened his 1932 Report by discussing some signs of improvement, though there was still great shrinkage in demand. The mortgage debt and all the other ills were now piled inexorably upon the farmer's emaciated income. Efforts to extend him credit had added to rather than removed his burdens.

Ordinary agricultural expenditures, it was stated, had absorbed only 10 percent of the Department's budget, whereupon the two-budget system was expounded by Secretary Hyde, -the separation of regular from emergency items. Most of the Department's funds, he said, went to road construction and emergencies. Its routine, old-line services, which cost relatively so little, were worth far more than they cost.

The Department's basic task was still held to be scientific research, the results of which were not intended so much to stimulate production as to help balance supply and demand, guarantee the dependability of production, raise living standards, and aid industry as a whole. This research also helped find new uses for agricultural commodities, thus founding new industries and spreading employment. It also improved the quality of commodities.

Again we see research had to be justified. The public had to be told that it did not cause all present ills. Its value should not be distrusted for really it had not devoted itself wholeheartedly to the production of agricultural surpluses.

NATIONAL LAND USE CONFERENCE HELD

The volume also contained a long section on land use. The planning and conservation of natural resources was stressed. After all the Department had been a pioneer in developing wise land use policies; it had formulated the entire theory. A National Land Use Conference had been held in Chicago at its suggestion where all

relevant ideas were discussed and programs were mapped out. The farm plant was still too large and land submarginal for agriculture simply contributed to tax delinquency, hence it must be kept out of cultivation. Soil erosion also must be stopped. Secretary Hyde said that the recommendations made by the conference on land use would be carried out.

On July 1, 1931 the Bureau of Agricultural Engineering was made a separate unit. Its work began in certain irrigation investigations started in the Office of Experiment Stations in 1898 but carried on in the Office of Public Roads since 1915. In the consolidation this Bureau, which was destined to have but a short career as an independent unit, took over the work of the divisions of farm machinery and farm management.

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ANOTHER DYNAMIC PERIOD 1933-

On March 3, 1933 Henry A. Wallace, an Iowa farm editor and son of Henry C. Wallace, became Secretary of Agriculture and ushered in another dynamic period in its history. All that was done in this period of action, however, had roots in the research, the discussion, and the social and economic thinking carried on in the Department during the previous more static decade of consolidation. Once more farm interests achieved sufficient unity to make known their desires to Congress. Once more the Department would have a spate of new laws to enable it to meet new problems for which its existing functions and techniques had been inadequate.

SUMMARIZATION OF FARMERS' HANDICAPS

As Secretary Wallace stated them in his Annual Report for 1934, the seven handicaps of the farmer since the World War were as follows: War-time crop expansion when 40 million additional acres had been plowed up; our abrupt change as a nation from a debtor to a creditor status; the displacement of horses and mules by mechanized power, releasing another 35 million acres; the effort of European nations to become agriculturally self-sufficient; new competition in our farm export trade from Argentina, Canada, Australia, and South Africa; the increase in our industrial tariffs which had resulted in reciprocal action by other nations to shut out our farm products; and the growth of corporate monopoly and price fixing, which compelled the farmer to take what was offered for products he sold and to pay what was asked for those he bought. Add in long-time abuses such as the homesteading of tracts that were too small—especially in areas of low rainfall, the destruction of our forests, the mining of our soil, and the wastage of our water resources, and we have the problem Secretary Wallace faced on assuming office.

AGRICULTURAL ADJUSTMENTS PROVIDED BY LEGISLATION

"In these circumstances," declared the Secretary, "economic planning became not merely advisable but necessary." Congress accordingly passed the Agricultural Adjustment Act, approved May 12, 1933. Here again, it should be noted, there was no sharp break with the past. The ideas in that act had been mulled over frequently within as well as outside the Department. W. J. Spillman had some of the notions in his *Balancing the Farm Output* published in 1927, and M. L. Wilson, also previously an employee of the Department, was in part responsible for drafting the act. Howard R. Tolley and Charles J. Brand, also associated with the legislation, were not new to the Department.

The Adjustment Act, as Secretary Wallace analyzed it in his first Report, sought to raise the income of farmers in two ways. Production was to be adjusted to demand. The Secretary of Agriculture was to enter into marketing agreements with producers, processors, and distributors of agricultural products, in order to eliminate competitive wastes, improve trade practices, move surpluses into the market, and raise producers' prices. It was a tremendous task, but the Secretary held that it was the only alternative to chaos.

The Agricultural Adjustment Act, generally referred to as the A.A.A., necessarily provoked thoughtful criticism as well as approval. In his Report for 1935, Secretary Wallace considered a number of the issues that had been raised. He denied that the measure sought to create artificial scarcity. Given a rising demand for a particular commodity, production would be increased accordingly. The long-term objective of the program was to prevent recurring cycles of over and underproduction. Its immediate aim was to restore agricultural prices "to their fair relationship with other prices and to continue such adjustments as will maintain that balance."

Production control alone, the Secretary admitted, was not the solution for the surplus problem. To realize the objective of a "balanced abundance," industry must prosper. The employed worker was a consumer of farm produce.

A planning measure necessarily involves controls and restraints or "social discipline." There is a danger that discipline may lead to regimentation. Secretary Wallace denied that the farm program conflicted with the essentials of democracy. Congress had acted in response to farm demand. Acreage adjustments on marketing agreements were effected only where large majorities favored them. Farmers themselves acting through county associations were largely responsible for the administration of the program.

The Secretary reported that the stock of surpluses had been sharply reduced. This was due partly to the production curtailments of the national farm program. Another very important factor was the drought of 1934, which was the worst ever recorded in the United States. It extended over 75 percent of the country, severely affecting 27 States.

A significant section of the 1935 Report was a discussion of the ever-normal granary concept. It had two aspects. The drought had emphasized the possible danger to the Nation of crop failures. At the same time the farmer must be protected against low prices resulting from abundant crops. The Secretary therefore suggested that supplies be stored and loans be made to the farmers on the basis of these reserves.

It was announced that several important changes had been made in the organization of the Department. The position of Under Secretary of Agriculture had been created and Rexford G. Tugwell appointed to fill the post. There was no longer to be a Director of Scientific Work, and an Office of Budget and Finance had been created.

In his third Annual Report, that for 1936, Secretary Wallace approached the problem of permanent agricultural adjustment. In 1933 drastic action had been necessary. With surpluses depleted and with farm income and farm real estate values increasing, the emergency was over and thought could be given to the matter of long-range planning. "Broadly, the object of a long-time farm-adjustment program," wrote Secretary Wallace, "should be to promote and encourage the best utilization of the individual farmer's resources, and at the same time to adjust farm production as a whole to yield the maximum farm income over a period of years. Essential to the program would be action to conserve soil fertility and to find other than farm uses for land not suited for farming."

The Secretary favored the regional approach. After all, the Cotton Belt, the Corn Belt, the citrus, dairying, tobacco, and cattle areas cross State lines, just as do problems in land utilization and the control of soil erosion. It was necessary to consider the separate problems of these regions and their interrelationships. This Secretary Wallace planned to do through close contact with the farmers and with the cooperation of State agencies. Production of the important farm commodities would be divided fairly among the different regions and then allocated among individual farmers.

In January 1936 the Supreme Court invalidated the compulsory features of the Agricultural Adjustment Act. Congress thereupon passed the Soil Conservation and Domestic Allotment Act. The Annual Report for 1937 contains a detailed description of this measure and the steps taken by the Department to enforce it. The discussion is prefaced by a noteworthy analysis of our national agricultural policy.

Secretary Wallace began by asserting that the United States had a national policy even before the first World War. Its main tenet was noninterference with the private appropriation and use of land. For a long time the policy worked. So long as there was abundant land, an open frontier, and a relatively sparse population, the quickest way to increase production, and therefore wealth, was to get the resources into private hands.

Eventually, the expansion program ran out of land. It forced the land hungry into submarginal farming, destructive grazing practices, and forest devastation. Charges accumulated on the older lands and drove producers into overproduction. Meanwhile, counties everywhere turned to a policy of economic nationalism.

STIMULATED OUTGROWTH RATHER THAN REVERSAL

An altered economic world called for a new agricultural policy. But the link between the old and the new was direct and close. The old exploitation forced the new conservation. The Federal Farm Board, the McNary-Haugen plan, the A. A. A. programs, and the Soil Conservation and Domestic Allotment Act had one basic characteristic in common. They all recognized that "modern problems cannot be solved by ancient formulas, and that agricultural policy today is necessarily in large measure the opposite of what it was in the period of the open frontier."

The 1938 Annual Report is a notable exposition of the principal policies of the New Deal in agriculture. Here pass in review marketing agreements and surplus removal, land use planning, and farm security. The Department's work in crop insurance, scientific research, forestry, and soil conservation are touched on. Above all, the stress is on human values. The underlying theme is the proper combination of abundance and democracy. "Man," declared Secretary Wallace, "needs both bread and freedom."

After this inspiring statement of faith, the Secretary dealt with the problem of administering the farm program. The major changes in the structure of the Department were along four lines. To the Bureau of Agricultural Economics was assigned the responsibility for formulating programs and plans to guide the entire group of agricultural, conservation, and marketing services. The execution of the marketing work was placed in four units responsible to the Secretary through a Director of Marketing

and Regulatory Work. The Soil Conservation Service took over all physical land use programs. Finally, research work in agricultural and industrial technology was placed under unified direction.

INTERLOCKING PROBLEMS CALL FOR INTERLOCKING SOLUTIONS

In all of this, the Secretary stressed, planning had been coordinated with administration, Federal-State relations clarified, and above all the farmer was enlisted as an essential partner in the agricultural program.

The year 1939 brought war to Europe. Its effects on American agriculture was the first topic discussed in the Annual Report for that year. The Secretary insisted that the outbreak of hostilities must not be taken as a signal to scuttle the farm legislation. We must continue our efforts to conserve the soil, keep farm output in adjustment with the current and prospective demand, and establish a rural-urban balance on the basis of equitable price relationships.

After discussing foreign trade briefly, the Secretary described the progress being made in land use planning, rural rehabilitation, rural electrification, home economics, and population adjustment. Surplus removal had been tied up with helping needy and undernourished families and increasing the domestic market. Two measures were adopted to these ends. Direct distribution was now made through the Federal Surplus Commodities Corporation and State welfare agencies, and the food-order stamp plan was in operation.

The Secretary called attention to the Mt. Weather agreement signed July 8, 1938. Under its terms, procedures were to be organized for enlisting the active cooperation of the land-grant colleges and farm people in planning and administering the "action" programs of the Department. The central objective has been the effective democratization of the farm program by coordinating local and national interests.

AGRICULTURAL ACTIVITIES STRENGTHEN DEFENSE

In his final Report, that for 1940, Secretary Wallace focused attention on the role of agriculture in national defense. In one short paragraph he summarized the essential contributions of agriculture:

Indeed, the entire national farm program strengthens the Nation's defense. With its emphasis on increasing farm income, on the conservation of resources, on the ever-normal granary, and on the improvement of rural living standards, it increases both wealth and welfare. It gives more people more of a stake in their country and more power to defend their country. Better adjustment of the farm output, conservation of resources, prudent accumulation of supplies in storage, and rational farm-price-adjustment measures enable agriculture to pull its weight in the defense program. All these things are defense resources because they give us conservation, stabilized farm income, a better nourished farm population, and in addition the conviction that in democracy we have something worth defending.

Secretary Wallace's final report cited the unpromising export outlook and the ominous rise of economic nationalism. It detailed the wide variety of defense functions the Department was performing and could perform, mentioning specifically activities of the Rural Electrification Administration, the Forest Service, the Soil Conservation Service, the Bureau of Agricultural Chemistry and Engineering, and the Agricultural Adjustment Administration. It called for a reexamination of our agricultural self-sufficiency and of the rural manpower problem.

The National Farm Program assumed a new position in our economy as war closed in upon us. It was difficult to foretell the future. Special sections of the report called for strengthening our ties with Latin America and provided an elaborate review of the Agricultural Adjustment Administration program. The effects of commodity loans, the surplus disposal programs including the Food Stamp Plan, marketing agreements, and the benefits of the land-use program were all appraised. On September 4, 1940, Secretary Wallace resigned his post to become a candidate for the Vice Presidency. Under-Secretary Claude R. Wickard of Indiana became the next head of the Department.

A brief review of the Department's organization and structure as changed since May 1933 now seems in order.

THE "ACTION AGENCIES"

Although the Agricultural Marketing Act was passed in 1929, followed by the establishment of the Farm Board, and the Foreign Agricultural Service Act was enacted in 1930, it was the Agricultural Adjustment Act of May 12, 1933, which ushered in much new legislation that resulted in the setting up of the so-called "action agencies" of the Department. This act was designed to establish and maintain such balance between the production and consumption of agricultural commodities, and such marketing conditions therefor, as would reestablish prices to farmers at a level that would give farm products the purchasing power they had in specified earlier base periods. The base period for most commodities was 1909 to 1914.

Some of the legislative acts authorizing other parts of this action program were as follows: The Emergency Farm Mortgage Act of 1933; the Farm Credit Act of 1933; the Federal Farm Mortgage Corporation Act and the Jones-Costigan Sugar Act of 1934; the Soil Erosion Act of 1935; the Soil Conservation and Domestic Allotment Act, the Rural Electrification Act, and the Flood Control Act of 1936; the Agricultural Marketing Agreement legislation, the act placing the functions of the Federal Surplus Commodities Corporation in the Department, the Bankhead-Jones Farm Tenant Act, the Norris-Doxey farm forestry legislation, the Pope-Jones water-facilities legislation, and the Sugar Act, all of 1937; and the Flood-Control Act, the Agricultural Adjustment Act, and the Federal Crop Insurance Act of 1938.

In order to carry out the intent of Congress as expressed in this and other legislation, many new agencies were created, such as: The Agricultural Adjustment Administration on May 12, 1933; the Federal Surplus Commodities Corporation on October 4, 1933; the Soil Conservation Service on April 27, 1935 (the Soil Erosion Service, transferred from the Department of the Interior, formed the nucleus of the new bureau); the Farm Security Administration, as the Resettlement Administration, on April 30, 1935; the Agricultural Marketing Service on July 7, 1939; and the Federal Crop Insurance Corporation on February 16, 1938. The Commodity Exchange

Administration, superseding the Grain Futures Administration, was created July 1, 1936.

Some of these agencies were created as independent establishments and later came to the Department where some of them have since undergone changes in name and structure. The Farm Credit Administration was created in 1933, but became part of the Department only on July 1, 1939. The Rural Electrification Administration was set up as an independent agency on May 11, 1935, and came to the Department July 1, 1939. The Commodity Credit Corporation was established October 17, 1933, and was placed in the Department July 1, 1939. The Surplus Marketing Administration was established in 1940, by combining the Division of Marketing and Marketing Agreements of the Agricultural Adjustment Administration with the Federal Surplus Commodities Corporation. The Resettlement Administration was an independent agency until it became part of the Department, January 1, 1937; before that its work began in the Federal Emergency Relief Administration.

The four Regional Research Laboratories of the Bureau of Agricultural and Industrial Chemistry were created in response to authorization in the Agricultural Adjustment Act of February 16, 1938.

SECOND WORLD WAR

Secretary Wickard was an Indiana dirt farmer. He graduated from Purdue with a degree in animal husbandry and, even before that, began helping to operate the family farm settled by his great-grandfather in 1840. He continued to manage the farm after he came to Washington in the 1930's. Before that he had been a member of the Indiana State Legislature. He was a member of the National Corn-Hog Committee of Twenty-Five which helped establish the original corn-hog program of the Agricultural Adjustment Administration.

In 1935, Mr. Wickard became chief of the Agricultural Adjustment Administration corn-hog work, thus being the third future Secretary to work in the Department in a subordinate capacity before assuming that office. When the Agricultural Adjustment Administration's agricultural conservation program started in 1936, Mr. Wickard became assistant director of the North Central Division. He was appointed Under Secretary of Agriculture on February 1, 1940. He had served as Secretary only a little over a year when Pearl Harbor ushered in the Second World War.

From December 5, 1942 until March 26, 1943, Mr. Wickard was in charge of the Nation's wartime food program, but Executive Orders issued March 26 and April 19, 1943, transferred the Secretary's authority in this respect to a War Food Administrator, appointed by and responsible to the President. On March 29, 1943, Chester C. Davis became the first War Food Administrator, serving until he resigned June 28, 1943; he was succeeded by Judge Marvin Jones, who served until the War Food Administration was recombined with the Department of Agriculture by Executive Order effective July 1, 1945. Mr. Wickard became head of the Rural Electrification Administration at this time.

At this point the structural changes in the Department from December 13, 1941, until the War Food Administration was created, will be reviewed.

REORGANIZATION FOR DEFENSE

An Office of Agricultural Defense (later War) Relations was set up in the Department on May 5, 1941, in response to a letter from the President. On July 5, Secretary's Memorandum No. 921, established State and county defense boards. On December 13, 1941, there was announced a major reorganization of the Department to streamline it for the war effort. This was validated by an Executive Order dated February 23, 1942. At this time three large administrations were established as follows: The Agricultural Conservation and Adjustment Administration was created by merging activities of the Agricultural Adjustment Administration (later Agricultural Adjustment Agency), the Soil Conservation Service, the Federal Crop Insurance Corporation, and the Sugar Division.

The Agricultural Marketing Administration was created by merging the activities of the Surplus Marketing Administration, the Commodity Exchange Administration, the Agricultural Marketing Service (except the Division of Agricultural Statistics, which returned to the Bureau of Agricultural Economics), and the Consumers' Counsel Division of the Agricultural Adjustment Administration. The latter Division, however, was not transferred until February 13, 1942.

The Agricultural Research Administration was created by grouping the activities of seven old-line scientific bureaus and agencies concerned with research and regulatory work, for Regional Research Laboratories, and nine Bankhead-Jones Laboratories. The Agricultural Research Center at Beltsville, Md., was also placed under the supervision of the Administrator. The bureaus concerned were those of Animal Industry, Dairy Industry, Plant Industry, Entomology and Plant Quarantine, Home Economics, Agricultural Chemistry and Engineering, and the Office of Experiment Stations.

Secretary's Memorandum No. 960, December 13, also established the Agricultural Defense Board and abolished the Program Board.

The Commodity Credit Corporation, Farm Security Administration, Farm Credit Administration, Forest Service, and Rural Electrification Administration remained unchanged in status.

On June 5, 1942, a Foods Requirements Committee was set up to control the production and allocation of all civilian and military food supplies, subject to the direction of the Chairman of the War Production Board. The Secretary of Agriculture became chairman of this centralized body which had power to direct and handle war-time food problems in close coordination with other complicated problems of war production. Executive Order No. 9280, December 5, 1942 made the Secretary a member of the War Production Board.

On June 9, 1942, the White House announced the appointment of a Combined Food Board, composed of the Secretary of Agriculture and the head of the British Food Mission. It was to effect planned and expeditious utilization of the food resources of the United Nations.

STREAMLINING FOR WAR

Fundamental reorganization of the Department again took place as a result of the Executive Order, dated December 5, which delegated to the Secretary of Agriculture authority to assume full charge of the Nation's wartime food program, and provided for organizational changes required. At that time the Food Production Administration and the Food Distribution Administration were established. These, with the Agricultural Research Administration, the Commodity Credit Corporation, the Forest Service, the Rural Electrification Administration, and the staff agencies, then constituted the Department. (See Secretary's Memorandum No. 1054, December 10, 1942.) Involved also in the December 1942 reorganization was a transfer of personnel from the Office of Civilian Supply, the Food Division, and other units of the War Production Board, to the Department, announced January 14, 1943.

The following agencies were originally consolidated into the Food Production Administration: The Agricultural Conservation and Adjustment Administration (except the Sugar Agency); the Farm Credit Administration; the Farm Security Administration; that part of the Division of Farm Management and Costs of the Bureau of Agricultural Economics concerned primarily with planning current production; and that part of the Office for Agricultural War Relations concerned primarily with food production.

Agencies consolidated into the Food Distribution Administration were; the Agricultural Marketing Administration; the Sugar Agency of the Agricultural

Conservation and Adjustment Administration; that part of the Bureau of Animal Industry of the Agricultural Research Administration concerned primarily with regulatory activities (meat inspection, 28-hour law); and that part of the Office for Agricultural War Relations concerned primarily with food distribution. The last-named office ceased to exist soon after this.

Under the President's Executive Order of December 5, 1942, the Secretary of Agriculture was authorized to:

Determine the direct and indirect military, other governmental, civilian, and foreign requirements for human food and animal feed and for food used industrially; formulate and implement a program to supply food adequate to meet the requirements, allocating the Nation's farm-production resources as needed; assign priorities and allocate food for all uses above-mentioned; insure the efficient and proper distribution of the available food supply; subject to special exceptions, to purchase and procure food for Federal agencies and to promulgate policies to govern the purchase and procurement of food by such agencies; make recommendations to the Chairman of the War Production Board covering the quantities and types of nonfood materials, supplies, and equipment required to carry out the program; jointly determine with the War Production Board Chairman the division to be made whenever the available supply of any food proves insufficient to meet both food and industrial requirements; determine the need and amount of food available for civilian rationing, exercising priorities and allocation powers through the Office of Price Administration; collaborate as necessary with other agencies concerned with the foreign aspects of the food program; in the event of a shortage of domestic transportation service, make recommendations to the Office of Defense Transportation, after consultation with the War Production Board. These, along with responsibility for agricultural manpower, are the powers that were later delegated to the War Food Administrator.

On December 19, 1942, as directed by the President, the Secretary appointed a committee composed of representatives of the War, Navy, and Interior Departments, the Office of Lend-Lease Administration, the Board of Economic Warfare, the War Production Board, and the Food Production and the Food Distribution Directors to advise and consult with him in carrying out the provisions of the Executive Order. A State Department representative, the Agricultural Research Administrator, and the President of the Commodity Credit Corporation were subsequently appointed to serve on the committee. The Administrator of Food Production and Distribution (later War Food Administrator) was also a member. The Foods Requirements Committee of the War Production Board, of which the Secretary was chairman, and which was established June 5, 1942, was then abolished.

On January 22, 1943, a Committee on Foreign Purchase and Importation was established, composed of the Director of Food Production, and Director of Food Distribution, the Administrator of Agricultural Research, the President of the Commodity Credit Corporation, the Director of the Office of Foreign Agricultural Relations, and heads of other agencies later designated.

Naturally the Secretary's wartime powers invested the Department with much more authority and importance than it had ever possessed hitherto. It began to touch the lives of every citizen and to assume a defense and later wartime role of the most critical character. Mr. Wickard's first annual report, submitted for 1941, on November 1 of that year, was prefaced by a "postscript" announcing the Japanese attack on Pearl Harbor and our precipitation into World War II.

The report proper dealt extensively with the impact of European war and the defense effort on agriculture. Immediately he took office Mr. Wickard foresaw that defense expenditures would boost incomes and the demand for farm commodities, so he asked urgently for increased agricultural production. Production goals for 1942 were worked out during 1941, in terms of needs, price incentives, and potential farm output. The determination of these goals was a tremendously complicated job well performed. Next they were translated into farm action and some were exceeded in a year of record farm production.

LEND-LEASE BRINGS CHANGES

Meanwhile the animal-protein needs of Great Britain became acute, the Lend-Lease Law was passed (March 11, 1941), and we began to export foods that we had rarely exported before, certainly not in any quantity. Fortunately the Ever-Normal Granary was full to bursting with animal feed under commodity loans, and this was turned as rapidly as possible into meat, milk, eggs, and poultry to keep Britain in the war. A reorientation of our agriculture was required both to achieve this purpose and to meet a quickly developing shortage of fats and oils formerly imported. Flax and hemp requirements assumed dramatic importance as well.

Gradually we began to produce what was needed for defense and war purposes, when needed, and in the quantity required. Farmers rose to new heights of efficiency each production year, the Department acting as over-all staff counsellor and adviser. The Department became active in the fields of labor supply, plant site location, and transportation problems, and rendered assistance to farmers in procuring supplies and equipment, priorities and allocations.

The Office of Agricultural Defense Relations set up divisions of production, farm equipment and supplies, labor and rural industries, and transportation and marketing. The Department's food-purchase programs, as well as its commodity loans, assumed new importance and new directions. The Department took part in the accumulation of strategic materials, found new uses for farm and forest products, gave engineering aid to the armed forces, and assisted in locating both defense industries and military and naval reservations.

A special far-reaching nutrition program was undertaken in foreknowledge that all our people must be reasonably well fed to meet the forthcoming emergency, and that we must also produce much food for our potential and probable Allies. The wartime job of the Agricultural Adjustment Administration became greater than ever before. The year's production was outstandingly favorable and we entered the war far better fortified than we should have been had no national farm program existed.

Secretary Wickard's annual report for 1942, submitted December 1 of that year, carried a foreword announcing that "Production above all expectations was agriculture's answer in 1942 to the Food for Freedom call." This was the name of the wartime campaign for greater agricultural production, later changed to Food Fights for Freedom. The campaign was eminently successful, farmers producing all-time record crops year after year, despite shortages of labor, supplies, and equipment. Already, however, land resources were strained, but per acre yields pretty consistently improved.

PLANNED FOOD PRODUCTION

Great Britain's request of a year before for high-protein foods was swiftly followed by the development of a full-fledged program of planned food production to give our own people their nutritional requirements, to provide for our armed forces, and to share with our Allies. Farmers were urged to produce maximum output despite reduced supplies of labor, machinery, fencing, fertilizer, insecticides, container materials, and storage facilities. In response, record production was achieved. Commodity loans on accumulated reserves of feed in the Ever-Normal Granary proved invaluable.

Through the State and County War Boards the Department gave farmers technical aid, made arrangements about price supports and money payments, and generally assisted them to fulfill their goal pledges. Every agency in the Department did its utmost to assist the Food for Freedom Program. Food conservation was stressed and scarce farm foods began to be allocated to specific needs. A research food-dehydration project soon showed the way to save cargo space and get more actual food value abroad more rapidly than ever.

Its new responsibilities compelled the Department to enter new fields. A few of the important developments of the year were: The perfection of an improved process for making butylene glycol, the guayule rubber-production project, a program to enable canners to operate at capacity, the Victory Food Special program for concentrating consumer demand on products temporarily in abundance, the voluntary meat-conservation program which preceded meat rationing, the pricing, processing and marketing program for oil crops, and various orders on the sale of new farm machinery and equipment.

The Office of Agricultural Defense Relations had now become the Office for Agricultural War Relations, and acted as liaison unit between the Department and other Government war agencies. Its main jobs were to relate farm production to military, lend-lease, and civilian needs, to provide basic data for the formulation of production goals, and to analyze agriculture's needs for machinery, fertilizer, and labor in the light of other war requirements.

This 1942 annual report discussed the role of food in modern war and combined food strategy, in considerable detail. Other sections of interest considered fuel for farm tractors, the pressure on storage facilities, the sharing of fertilizer components, the farm labor supply, lend-lease and other distributing operations, and the Victory Garden Campaign. This last assumed tremendous Nation-wide importance and finally provided the greatest mass application of information developed by plant research in the world's history. On the whole, 1942 production of crops and live-stock displayed a remarkably close adjustment to national needs.

WAR FOOD ADMINISTRATION

Before the Secretary's annual report for 1943, dated December 1 of that year, was submitted, the War Food Administration had been established. We shall now trace its organizational history until its reabsorption into the Department of Agriculture, and afterwards consider the Department's activities for 1943 and 1944.

For war purposes the program agencies of the Department of Agriculture were grouped into two administrative units, each headed by an official appointed by and directly responsible to the President. The agencies in the War Food Administration were responsible to the War Food Administrator. The Agricultural Research Administration, Farm Credit Administration, Rural Electrification Administration, and Forest Service were responsible to the Secretary of Agriculture.

The over-all service and staff agencies served both the War Food Administration and the Department of Agriculture in the same way. These agencies were the Bureau of Agricultural Economics, the Office of Budget and Finance, the Office of Foreign Agricultural Relations, the Office of Information, the Library, the Office of Personnel, the Office of the Solicitor, the Office of Plant and Operations, and the Land Use Coordinator.

By Executive Order No. 9322, March 26, 1943, the President first consolidated into one unit the Food Production Administration (except the Farm Credit Administration), the Food Distribution Administration, the Commodity Credit Corporation, and the Extension Service of the Department of Agriculture. The resulting agency was then named the Food Production and Distribution Administration, but Executive Order No. 9334, April 19, 1943, changed the designation to War Food Administration. The Order of March 26, 1943, transferred to the War Food Administrator, all powers, functions, and duties conferred upon the Secretary by Executive Order No. 9280, December 5, 1942, and those relating to labor and manpower.

The primary responsibility of the War Food Administration was to assure an adequate supply and efficient distribution of food to meet war and essential civilian needs. Executive Order No. 9334 so defined the respective duties and functions of the Secretary of Agriculture and the War Food Administrator that, in order to carry out its purposes, each had authority to exercise any and all powers vested in the other by statute, or otherwise, to the extent necessary to enable them to perform their respective duties and functions.

On April 30, 1943, the War Food Administration announced an organization to administer the farm labor program. The Director of the Extension Service became responsible for mobilizing farm labor for use within each State, and for the placing of all workers needed on farms to meet local labor needs. Responsibility for the supply and distribution of foreign labor, and of domestic labor moved from one State to another, was given to the Director of Interstate and Foreign Labor. The position of Deputy Administrator for supervision of both labor programs was also established April 30, 1943, and an Office of Labor with a deputy administrator in charge, on June 21 following. (WFA Memorandum No. 2, April 30, 1943, as revised, June 21.)

An Office of Materials and Facilities, to aid farmers with their procurement problems, was established May 10, 1943, by War Food Administrator's Memorandum No. 4. The War Meat Board was established May 15, 1943, to facilitate the handling of the Nation's meat supply. Its creation was announced jointly by the War Food

Administration and the Office of Price Administration, its Chairman being an authorized representative of the former.

On May 27, 1943, the War Board Services Branch of the Food Production Administration was transferred to the Office of the War Food Administrator. The War Food Administration established an Office of Labor on June 21, 1943, and on May 10, 1943, an Office of Materials and Facilities was created. On May 12, 1943, the War Food Administrator authorized the establishment of Food Industry Advisory Committees, previously authorized and established in the Department of Agriculture, for the purpose of furnishing recommendations and advice in connection with the formulation and execution of food programs of the War Food Administration.

OTHER NECESSARY ADJUSTMENTS

A Director of Transportation was appointed May 26, 1943. On August 25, 1943, the War Food Administration announced the establishment, effective September 1, of a National War Board. The name of the Agricultural Defense Board established in December 1941 had been changed to U.S.D.A. War Board February 25, 1942 (Secretary's Memorandum No. 960, Supplement 3), it having been called the Departmental War Board in Secretary's Memorandum No. 1054, December 10, 1942. An Office of War Board Services was set up August 26, 1943 but was discontinued the following December 30.

The Combined Food Board was reconstituted on October 28, 1943, pursuant to Executive Order No. 9334, with the War Food Administrator as U. S. member, the Secretary as Chairman, and a Canadian in addition to the British member. At the same time the Food Advisory and the Interagency Allocations Committee were abolished, their functions being combined and transferred to a Food Requirements and Allocations Committee. The Committee received all estimates of food requirements and recommended all food allocations. The Price Support Committee was established on November 5, 1943, to prepare recommendations covering commodities to which the War Food Administration would give price support and the level of such support prices during the crop year 1944-45.

Administrator's Memorandum No. 27, Supplement 4, January 21, 1944, changed the names of the Food Production Administration and the Food Distribution Administration to Office of Production and Office of Distribution, respectively. It redefined the functions of these offices and of the Commodity Credit Corporation, and established an Office of Price to deal with problems relating to the approval of maximum prices and price supports for agricultural commodities. It made Soil Conservation Service, Farm Security Administration, and Agricultural Adjustment Agency independent agencies in the War Food Administration.

Administrator's Memorandum No. 27, Supplement 10, October 26, 1944, established the Office of Surplus Property and Reconversion, and Supplement 11 of the same, issued November 10, 1944, designated a Director of and created an Office of Water Utilization to work closely with the Land Use Coordinator.

Administrator's Memorandum No. 27, Revision 1, December 13, 1944, as amended, issued January 5, 1945, reorganized the War Food Administration. The Offices of Production and of Distribution were abolished. Initially Offices of Marketing Services, Basic Commodities, and Supply were created, but finally only the first remained an independent agency, and the last two were placed in the Commodity Credit

Corporation under Vice Presidents thereof who were directly responsible to the War Food Administrator in carrying out their program activities. They also became Directors of Basic Commodities and of Supply, respectively.

The Federal Crop Insurance Corporation became an independent agency and ceased reporting administratively to the Director of Production, as had been the case. That part of the Office of Marketing Services concerned with school-lunch and direct-distribution programs was transferred to the Commodity Credit Corporation and placed under the Vice President designated Director of Supply. Functions, funds, personnel, and property of the Office of Production were transferred to the Agricultural Adjustment Agency, except those relating to soil-conservation and land-use activities, which were transferred to the Soil Conservation Service.

The Office of Investigatory Services was established March 23, 1945, by Administrator's Memorandum No. 27, Revision 1, Supplement 4. The Office of Requirements and Allocations was established April 12, 1945, in response to Administrator's Memorandum No. 27, Revision 1, Amendment 7, of April 11, and the Office of Home Food Supply by Supplement 5, thereto, dated June 5, 1945, a Director of Home Food Supply having been appointed the previous May 25.

The following changes in names of some old-line Department bureaus should also be mentioned. In February 1943, certain organizational and structural shifts were made in the bureaus comprising the Agricultural Research Administration in the course of which the Bureau of Home Economics with the addition of the Division of Protein and Nutrition Research, formerly of the Bureau of Agricultural Chemistry and Engineering became the Bureau of Human Nutrition and Home Economics; the Bureau of Agricultural Chemistry and Engineering became the Bureau of Agricultural and Industrial Chemistry, with the four Regional Research Laboratories now comprising most of it; and the Bureau of Plant Industry became the Bureau of Plant Industry, Soils and Agricultural Engineering.

GREATER AND GREATER FOOD PRODUCTION

During 1943 farm food production, as well as farm production generally, again set a record. The Department and the War Food Administration regarded food as a munition of war, selective crop expansion continued, but demand always outran supply because of the increase in our armed forces, in the requirements of our Allies, and in domestic purchasing power. Allocation of food to satisfy these demands became a major problem, along with efforts to facilitate its production, storage, and transportation in every possible way.

A new farm production record was set for 1943 and new goals were developed for 1944. The price stabilization problem occupied much attention. Expanding interests of the Department are indicated by section heads in this annual report such as: The World's Food and American Agriculture, United Nations Food Conference, the World's Nutrition Problem, and Our Own Nutritional Status. Inflationary land values and price trends generally demanded serious attention. The Commodity Credit Corporation greatly expanded its operations in response to wartime emergency needs. Government food procurement was stepped up enormously and rationing was applied to a number of foods.

On February 15, 1944, War Food Administrator Marvin Jones issued a document on the Food Program for 1944. This discussed the food problem as a whole, requirements to be met, increases in farm production since 1939, the production policy, and the 1944 agricultural production goals. Sections were also devoted to price support and stabilization activities, foreign food procurement, food distribution, farm labor, materials and facilities, the wartime fishery program, the world food situation, and the role of the individual citizen of the United States.

PEACE AND THE WORLD VIEW

Mr. Wickard's final report as Secretary was submitted December 1, 1944, and was for that year. The first subhead is indicative of the trend: Agriculture Looks Toward Winning the Peace. Already devices were being considered for maintaining a high post-war demand for food, and the main problems of agricultural reconversion demanded attention. On the assumption that full employment would prevail in the post-war period, plans were being made to continue record farm production.

The world viewpoint assumed by the Department is significant of the way in which science had shrunk distances. Agriculture now had to be considered, not only in relation to domestic industry, but in the light of world finance and the plans of the United Nations as well. The world organization of agriculture came into the picture with the meeting of the United Nations Food and Agriculture Conference, at Hog Springs, Va., in May and June 1943. The constitution for the Food and Agriculture Organization was already being proposed.

The food problem in continental Europe after liberation also drew attention. The report said: "There is little doubt that upon the end of hostilities in Europe the Continent will be badly in need of food. Even if there should be no further decline in overall production, a deterioration of the food situation in some areas and among some population groups must be feared because of transport difficulties and a prospective relaxation of the controls of food collection and distribution in a number of regions."

The food conditions in the Far East and especially in Japan aroused comment. Cooperation with Mexico and other Latin American countries was stressed. Both prices after the war and the handling of food reserves evoked concern. Among other matters discussed in the report were the termination of wartime controls, the stupendous operations of the Commodity Credit Corporation, the upward trend in farm mechanization, rural health, sanitation, and safety, the farm housing problem, and the planning of rural public works.

The final report of the War Food Administrator was submitted to the President June 30, 1945, the day before the Administration was reabsorbed into the Department. It dealt with the food programs and problems of 1943 and 1944, with support prices, farm production, the war food distribution job, storage and transportation, farm labor, and numerous other minor but significant activities of the Administration throughout its existence. As stated therein: "Farmers of the United States set a new all-time production record in each of the war years, up to and including 1944," while 1945 production turned out to be on as huge a scale.

During the war many new discoveries and ideas, ranging all the way from the natural to the social sciences, which had resulted from research, but were restrained from full utilization by the long depression, came into their own and could be used at top efficiency. Among these were better varieties of plants and animals, better protection from insect pests and plant and animal diseases, expanding mechanization, improved cultural and fertilizing methods, increased storage of fertility in the soil by the widespread use of conservation measures, the farm security device of supervised loans which gave borrowers funds and expert advice together in one package, and the use of price incentives and other economic devices to get the crops needed when they were needed.

In spite of some adverse criticism the Department's wartime organization worked exceptionally well for the purposes intended. The War Food Administration being largely part of the Department, yet autonomous, was economical in operation. But, as peace approached, the War Food Administrator saw the need for reorganization and reconsolidation, and he resigned and returned to the bench that this might take place, while the Secretary at the same time became head of the Rural Electrification Administration.

PEACE BRINGS RECONSOLIDATION

On July 1, 1945, Clinton P. Anderson took office as Secretary, to have charge of both the Department of Agriculture and the War Food Administration, and to consolidate and organize them as he thought best. He regarded himself as primarily a businessman rather than a farmer, though he grew up on a farm, and also operated 800 acres of irrigated land in New Mexico as a dairy enterprise. In addition, he retained direction of the home farm of 640 acres, near Mitchell, S. Dak.

He was president of a mutual casualty company, which he organized in 1937, and he operated a general insurance agency in Albuquerque. He had for years been active in civic clubs and served a year as president of Rotary International. At the time of his appointment he was a member of the U. S. House of Representatives, serving his third term, and had been chairman of a committee investigating food shortages. Born at Centerville, S. Dak., he was educated at Dakota Wesleyan and at Michigan universities. The first job facing him was departmental reorganization. To recapitulate:

On June 29, 1945, the President, by Executive Order No. 9577, provided for the abolition of the War Food Administration and for the transfer of its functions to the Department of Agriculture. This terminated Executive Order No. 9334 of April 19, 1943. Records, property, personnel, funds, and agencies of the War Food Administration were thus placed under the jurisdiction of the Secretary of Agriculture. The President's Executive Order took effect at the close of business on June 30, 1945. In Memorandum No. 1106, July 3, 1945, the Secretary announced the appointment of a Committee on Reorganization, Milton S. Eisenhower, chairman, to confer with all agency heads, and so to integrate the War Food Administration and the Department of Agriculture as to avoid overlapping, duplication of functions, and inefficiency in service to the public.

Secretary's Memorandum No. 1118, August 18, 1945, announced the establishment of a Production and Marketing Administration which was, in effect, a consolidation of the following agencies: Office of Basic Commodities, Office of Supply, Office of the President of the Commodity Credit Corporation, Offices of the Manager and of the Secretary of the Federal Crop Insurance Corporation, Office of Marketing Services, Agricultural Adjustment Agency, Office of Requirements and Allocations, Office of Price, Office of Transportation, Office of Materials and Facilities, Office of Labor, Office of Home Food Supply, Office of Investigatory Services, and the liquidating of the Federal Surplus Commodities Corporation.

Secretary's Memorandum No. 1132, October 26, 1945, established State and County Department of Agriculture Councils. Secretary's Memorandum No. 1135, November 29, 1945, abolished the Office of Surplus Property and Reconversion and transferred its staff and part of its functions to the direction of the Assistant Secretary.

Secretary's Memorandum No. 1139, December 12, 1945, effective December 31, 1945, redefined the functions and organization of the Bureau of Agricultural Economics, making it more than ever responsible for the collection and dissemination of agricultural statistics, economic research, and the dissemination of the results thereof, transferring leadership in general agricultural program planning to the Office of the Secretary, and responsibility for fostering groups for public study and discussion of broad agricultural problems and policies to Extension Service. The memorandum also established a Situation and Outlook Board. On the same dates Memorandum No. 1140 established the Policy and Program Committee, named its members, and defined its functions.

FAMINE OVERSEAS AND ITS RELIEF

The Office of Foreign Agricultural Relations reported on the challenging world food crisis in the fall of 1945, but the Nation was somewhat slow about getting into action. An earlier presentation had been made by the Interagency Committee on Foreign Shipments of the Office of War Mobilization and Reconversion in its Food Report to the Director of the Office of War Mobilization and Reconversion April 30-May 1, 1945.

The President's 9-point Famine Relief Program was announced February 6, 1946, and the Department immediately began to take steps to implement it. Review of the Department's food programs was ordered February 15 and revision of 1946 farm-production goals on February 21. Memorandum No. 1150 established a Department Committee on Home Gardening, February 26. The Famine Emergency Committee met in the White House March 1, on call of the President. The Department in rapid succession announced various measures to conserve grain and meet the famine emergency.

On March 8, 1946, State directors of the Production and Marketing Administration and chairmen of the county agricultural conservation committees were designated State and county emergency food program managers to help speed the supply of food for the emergency famine relief program. The Famine Emergency Committee, after an all-day session at the Department, announced on March 11, its specific recommendations for the conservation of wheat, wheat products, and food fats and oils.

Secretary's Memorandum No. 1156, March 19, 1946, established an Office of Emergency Food Program in the Office of the Secretary to coordinate and give general direction to all phases of the program, and to assist the Secretary in providing food for relief shipment abroad. On April 9, a report by Herbert Hoover to the Famine Emergency Committee on European food needs was released and the next day the Secretary issued a call for world aid in the food fats and oils crisis.

Secretary's Memorandum No. 1158, April 10, 1946, provided for coordination of relationships between the Department and the Food and Agriculture Organization of the United Nations.

NEW LEGISLATION

The Research and Marketing Act, which became law August 14, 1946, provided for extension and expansion of Department research programs. The Farmers Home

Administration Act became law the same day, abolishing the Farm Security Administration as such, establishing the Farmers Home Administration, and giving it various functions and responsibilities, including some which formerly lodged in the Farm Credit Administration. (See Secretary's Memorandum No. 1171, August 19.)

Secretary's Memorandum No. 1172, August 21, 1946, transferred enforcement of the Meat Inspection Act and the 28-Hour Law, effective October 1, back into the Bureau of Animal Industry from the Livestock Branch of the Production and Marketing Administration where it had been placed by Executive Order No. 9280, December 5, 1942.

Secretary Anderson's first annual report was submitted December 15, 1945, for that year. After citing the record of food as a weapon of war, it went on to deal with agriculture's power to produce and its reconversion problems. A section was devoted to the work of the Food and Agriculture Organization and another to food throughout the world. From the very beginning of his administration, Secretary Anderson called for continued high farm production regardless of what industry might do. The Department's foresight was proved sound when famine conditions the world over made it necessary for the United States to help actively with the postwar food problem of liberated and conquered nations.

The measures adopted to increase grain exports were generally successful and, towards the end of 1946, certain domestic restrictions were eased. Meanwhile another potato glut occurred and it became increasingly evident that wartime loan and price-support programs would not always work successfully under conditions of peace. On November 26, 1946, and again on January 22, 1947, Secretary Anderson brought this situation to the attention of the Congress.

Net losses were heavy both in money and in potatoes, but under existing legislation the Department could seek only to curtail acreages and give minimum price support. Even then good weather in the high-yield areas, a tendency to curtail acreages mainly in the low-yield areas, the more widespread use of DDT, and increased use of fertilizer and favorable cultural practices could give us a potato crop larger than we could handle at almost any time.

In late 1946 an outbreak of foot-and-mouth disease was discovered in the Republic of Mexico and it rapidly spread over that country. Special legislation and the consent of the Mexican Government enabled the United States to cooperate with her nearby neighbor in efforts to stamp out the infection before it reached our livestock. This campaign began in 1947 and continued on into 1948.

On March 31, 1947, sugar rationing was transferred to the Department of Agriculture, but lack of funds forced its liquidation July 28, 1947. Passage of the First Decontrol and the Sugar Control Extension Acts, approved April 1, reduced the number of the powerful War Food Orders to only eight.

On October 3, 1947, the Farm Grain Savings Campaign was launched. The Office of Food and Feed Conservation was established, with the Assistant Secretary as Director, on January 27, 1948. A new food conservation program affecting consumers, home economists, the food industries, the retail food stores, restaurants, and food handlers was announced. Millions of copies of a booklet on economical feeding of families, entitled "Money-Saving Main Dishes", were distributed.

From the beginning to the end of his administration Secretary Anderson called for practically all-out farm production; this he did regardless of what curtailment plans industry might undertake. He consistently praised the ability, industry, and integrity of the Department's employees and fought ably to improve their welfare. He defended the Department's information work and differentiated sharply between it and propaganda. He was notable for his organizational, administrative, and speaking ability. He resigned May 10, 1948, to run for the Senate.

FURTHER CHANGES

Secretary Anderson was succeeded in office by his own Assistant Secretary, Charles F. Brannan, a career employee he highly recommended for the office. On being notified of his appointment Mr. Brannan announced that Mr. Anderson's programs should be continued. Mr. Brannan's especial interests had long been the development and maximum scientifically justifiable utilization of our forest, land, and water resources.

A native of Denver who graduated from the University of Denver Law School, Mr. Brannan specialized in irrigation and mining cases in private practice until he became an assistant regional attorney for the Resettlement Administration, in 1935. Two years later he became Regional Attorney for the Department's Office of the Solicitor, with headquarters still in Denver.

In 1941, Mr. Brannan became Regional Director of Farm Security Administration for Colorado, Wyoming, and Montana, still in his native city. For some time he was part owner of a cattle and grain ranch near Eads, in Yuma County, Colo.

In 1944 he was called to Washington to become Assistant Administrator of Farm Security Administration, and was appointed Assistant Secretary of Agriculture two months later. As Vice Chairman of the Department's Program and Policy Committee he had much to do with formulating and carrying out policies, and he presented the Department's long-range agricultural program to Congress, in 1947.

This account ends just after Secretary Brannan assumed office on June 2, 1948.

FACING THE FUTURE

The paramount fact of peacetime importance in the wartime farm production program was the large increase in total output which was accomplished under adverse conditions because of improved farm technology, rather than by increase of plant capacity or acreage. We learned how to feed 50 million more people with the same effort right during a period when all elements which promote enhanced farm production were scarce. No finer vindication of the great Federal-State research program, carried on by the Department throughout its history, could possibly be imagined.

With due allowance for favorable weather, wartime farm output averaged 120 percent as compared with 100 for 1935-39; farm food output averaged 117 percent. This great increase constituted an unprecedented and irrevocable break with the immediate past. Farm population had dropped from 30 millions in 1940 to only 25 millions in 1945. There were 8 to 10 percent fewer farm workers, and those available

probably averaged no more than 85 percent of the efficiency of those employed in prewar years. Yet production per worker, per acre, and per unit of livestock steadily climbed. To quote Sherman E. Johnson:

"By a fortunate conjuncture of circumstances progress in mechanization, an increased use of lime and fertilizer, cover crops, and other conservation practices, use of improved varieties, a better balanced feeding of livestock, and more effective control of insects and disease had all gathered momentum over the several years preceding World War II. Their current effects were obscured by the drought and depression of the 1930's, but developments had reached a stage where these improvements could be effectively combined and used in an all-out production effort. The result was an unprecedented production increase."

APPENDIX

MAJOR CHANGES IN THE ORGANIZATION OF THE DEPARTMENT OF AGRICULTURE AND IN ITS CONSTITUENT AGENCIES SINCE 1933

The Agricultural Adjustment Administration was created May 12, 1933, in response to the passage of the first Agricultural Adjustment Act. By Executive Order No. 9069 it became part of the Agricultural Conservation and Adjustment Administration, February 23, 1942. It was renamed the Agricultural Adjustment Agency, February 26, 1942, and became part of the Food Production Administration in response to Executive Order No. 9280, December 5, 1942. Executive Orders Nos. 9322, March 26, and 9334, April 19, 1943, made it part of the War Food Administration, and it became an independent agency therein January 21, 1944. Secretary's Memorandum No. 1118, August 18, 1945, made it part of the Production and Marketing Administration.

The Soil Conservation Service was created as the Soil Erosion Service, Department of the Interior, on September 19, 1933, as a result of passage of the National Industrial Recovery Act, which provided for soil-erosion control as a means of unemployment relief. The President transferred this Service to the Department of Agriculture, March 25, 1935, and Department erosion-control activities were consolidated in it April 1. The Soil Conservation Service was established as a result of the Soil Erosion Act, approved April 27, 1935. Executive Order No. 9069, February 23, 1942, combined it with the Agricultural Adjustment Administration, the Federal Crop Insurance Corporation, and the Sugar Division to form the Agricultural Conservation and Adjustment Administration, a change announced December 13, 1941, however. It became part of the Food Production Administration by Executive Order No. 9280, December 5, 1942, and Executive Orders Nos. 9322, March 26, and 9334, April 19, 1943, made it part of the War Food Administration, in which it became an independent agency January 21, 1944. Secretary's Memorandum No. 1118, August 18, 1945, made it an agency of the Department of Agriculture again.

The Commodity Exchange Administration was established July 1, 1936, by Secretary's Memorandum No. 700; it superseded the Grain Futures Administration, which had been created under provisions of the Grain Futures Act of September 21, 1922. Pursuant to Executive Order No. 9069, February 23, 1942, the Administration became part of the Agricultural Marketing Administration, which was transformed into the Agricultural Marketing Service, in accordance with Secretary's Memorandum No. 830, July 7, 1939, pursuant to the Agricultural Appropriation Act approved June 30, 1939. It went into the Food Distribution Administration under provisions of Executive Order No. 9280, December 5, 1942, and became part of the War Food Administration under Executive Orders Nos. 9222, March 26, and 9334, April 19, 1943. Secretary's Memorandum No. 1118, August 18, 1945, made it part of the Production and Marketing Administration. Memorandum No. 1185, January 21, 1947, established the Commodity Exchange Authority effective February 1, 1947, under an administrator directly responsible to the Secretary.

The Farm Security Administration became the Farmers Home Administration under the Farmers Home Administration Act approved August 14, 1946. Its work began in the Federal Emergency Relief Administration and the State Rehabilitation Corporations, these functions being brought later into the Resettlement Administration, established as an independent unit by Executive Order No. 7027, April 30, 1935. Executive Order

No. 7530, December 31, 1936, made the Resettlement Administration part of the Department of Agriculture, where it assumed the name Farm Security Administration, September 1, 1937, in response to Secretary's Memorandum No. 732. Executive Order No. 9280, December 5, 1942, made it part of the Food Production Administration, which was consolidated into the War Food Administration by Executive Orders Nos. 9322, March 26, and 9334, April 19, 1943. It became an independent agency of the Administration under Administrator's Memorandum No. 27, Supplement 4, January 21, 1944, and Secretary's Memorandum No. 1118, August 18, 1945, made it an agency of the Department of Agriculture again. The Farmers Home Administration Act of 1946 abolished it as such and authorized creation of a Farmers Home Administration; Secretary's Memorandum No. 1171, August 19, 1946 established it and it began to function as such November 1.

The Agricultural Marketing Service was created by Secretary's Memorandum No. 830, July 7, 1939, the work having originally been set up by Secretary's Memorandum No. 783, October 6, 1938. It became part of the Agricultural Marketing Administration pursuant to Executive Order No. 9069, February 23, 1942, and was consolidated into the Food Distribution Administration by Executive Order No. 9280, December 5, 1942. It also became part of the War Food Administration pursuant to Executive Orders Nos. 9322, March 26, and 9334, April 19, 1943, and part of the Production and Marketing Administration, under Secretary's Memorandum No. 1118, August 18, 1945.

The Federal Crop Insurance Corporation was created by the Agricultural Adjustment Act of February 16, 1938. In response to Executive Order No. 9069, February 23, 1942, it became part of the Agricultural Conservation and Adjustment Administration, which went into the Food Production Administration, created December 10, 1942, in response to Executive Order No. 9280, December 5, 1942. The then Office of Production was abolished January 1, 1945, and the Federal Crop Insurance Corporation became an independent agency of the War Food Administration. Secretary's Memorandum No. 1118, Supplement 1, October 8, 1945, established it as a bureau in the Production and Marketing Administration. Secretary's Memorandum No. 1196, June 26, 1946, made it a separate unit in the Department as of the following July 1.

The four Regional Research Laboratories of the Bureau of Agricultural and Industrial Chemistry were created by the Agricultural Adjustment Act of February 16, 1938.

The Farm Credit Administration was created by Executive Order No. 6084, dated March 27, and effective May 27, 1933; it was formed by combining several existing agricultural credit agencies. It became part of the Department of Agriculture pursuant to Reorganization Plan No. 1, as of July 1, 1939. Executive Order No. 9280, December 5, 1942, made it part of the Food Production Administration, but it returned to its former status as a separate agency of the Department under Executive Orders Nos. 9322, March 26, and 9334, April 19, 1943. Certain functions were transferred from it to Farmers Home Administration by the Act of August 14, 1946.

The Rural Electrification Administration was established as an independent agency by Executive Order No. 7037, May 11, 1935, and became part of the Department of Agriculture July 1, 1939, pursuant to Reorganization Plan No. II. Statutory provision for the agency was made in the Rural Electrification Act of 1936, approved May 20 that year.

The Commodity Credit Corporation was established October 17, 1933, under Executive Order No. 6340, dated October 16, and became part of the Department of Agriculture pursuant to Reorganization Plan No. I, effective July 1, 1939. Its original creation was pursuant to the National Industrial Recovery Act of June 16, 1933. Executive Orders Nos. 9322, March 26, and 9334, April 19, 1943, made it part of the War Food Administration, upon the termination of which, Secretary's Memorandum No. 1118, August 18, 1945, consolidated it into the Production and Marketing Administration.

Research work on soils was transferred to the Bureau of Plant Industry from the Bureau of Chemistry and Soils in October 1938, the remainder of the soils work then being placed in Soil Conservation Service. The Bureau of Agricultural Engineering was combined with the remaining chemical work and the Bureau of Agricultural Chemistry and Engineering was created by Secretary's Memorandum No. 789, October 16, 1938. In February 1943, agricultural engineering research was placed in the Bureau of Plant Industry which changed title then to the Bureau of Plant Industry, Soils, and Agricultural Engineering, while the Bureau of Agricultural Chemistry and Engineering became the Bureau of Agricultural and Industrial Chemistry, the four Regional Research Laboratories mainly constituting it. The Bureau of Home Economics became the Bureau of Human Nutrition and Home Economics in February 1943, after transfer to it of certain nutrition work previously carried on in the Bureau of Agricultural Chemistry and Engineering.

In October 1938 the Secretary made the Bureau of Agricultural Economics primarily a research and planning organization, appointed a director of marketing to coordinate all phases of the Department's marketing activities, and placed all physical operations in land use programs for farm land under the Soil Conservation Service. Under Secretary's Memorandum No. 1139, effective December 31, 1945, the Bureau's responsibility for coordinating the statistical work of the Department (cf. Secretary's Memorandum No. 1042, October 13, 1943) was strengthened, and it became the Department's primary agency for the collection and dissemination of agricultural statistics, for economic research, and the dissemination of the results thereof. Responsibility for leadership in general agricultural program planning was transferred to the Office of the Secretary.

ORIGIN OF THE OLDER UNITS AND LINES OF WORK

The following paragraphs indicate how the various lines of work undertaken in the Department of Agriculture originated, when the various sections, divisions, offices, and bureaus acquired formal status, and, in general, the origin of the departmental units established before 1933. The date given is not always precisely the one on which the unit was formally established. It is sometimes the date of the commissioner's or secretary's report in which the unit was mentioned as having been created, established, or transferred; it is sometimes the date of the appropriation act authorizing such action.

Work on Plants. The Department Propagating Garden was started in 1858 under the supervision of the Commissioner of Patents who had, in 1856, engaged a botanist at the suggestion of Joseph Henry, Secretary of the Smithsonian Institution. Soon after the creation of the Department in 1862 the Division of Gardens and Grounds was organized under a superintendent. The Division of Botany was established in March 1869, and it maintained the United States National Herbarium until July 1, 1896,

when transfer to the Smithsonian took place. The Division of Pomology was set up in 1886 and that of Vegetable Physiology and Pathology, which began as a Section of Mycology in the Division of Botany in 1886, attained division status in 1890. Fiber investigations began in the Division of Statistics in 1889 and the Office of Fiber Investigations was established in 1890. The Division of Agrostology originated in the Division of Botany and became independent July 1, 1895; its field was the study of forage crops and grasses. Plant exploration became a recognized activity in 1897. All work in the field of plant industry was combined as the Bureau of Plant Industry in 1901. In 1943 it became the *Bureau of Plant Industry, Soils, and Agricultural Engineering*. Both agricultural extension work and studies in agricultural economics had their origin in this bureau.

Statistics and Economics. The collection of agricultural statistics was an activity that began in the Patent Office in 1839. With the establishment of the Department, the Division of Statistics was set up in 1863. It grew into the Bureau of Statistics in 1903, absorbing the Division of Foreign Markets organized the previous year. The Bureau of Statistics became the Bureau of Statistics and Crop Estimates in 1913 and the Bureau of Crop Estimates in 1914. A second line of activity began in 1913 with the creation of the Office of Markets and the Rural Organization Service. These were merged in 1915 as the Office of Markets and Rural Organization, which in 1917 became the Bureau of Markets. The Bureau of Crop Estimates was combined with it to form the Bureau of Markets and Crop Estimates in 1921. Still another line of economic research derived from the farm management work conducted by the Bureau of Plant Industry. The activity was organized into the Office of Farm Management in 1905 and came under the Secretary's Office in 1915. By 1920 the Office of Farm Management and Farm Economics was an independent office of the Department. Finally in 1922 the *Bureau of Agricultural Economics* was designated in order to combine the economic research. In October 1938 the Bureau was named a central research and planning agency of the Government.

Chemistry. The chemist of the Department originally covered a wide field and even analyzed many nonagricultural products. The Department's first chemist was appointed August 21, 1862, and the Division of Chemistry was established the same year. It became the Bureau of Chemistry in 1901. Enforcement of the Food and Drugs Act of 1906 was lodged in this bureau though its other activities were primarily in the field of research. In 1927 the two lines of activity were separated and the regulatory work went into an independent unit first called the Food, Drug, and Insecticide Administration, later merely the Food and Drug Administration. At the same time the Bureau of Soils was combined with what remained of the old Bureau of Chemistry as the Bureau of Chemistry and Soils. In 1938 research work in soils was transferred to the Bureau of Plant Industry and the other soil work to the Soil Conservation Service. At the same time the Bureau of Agricultural Engineering was combined with the nonsoil work of the Bureau of Chemistry and Soils and the unit became the Bureau of Agricultural Chemistry and Engineering. In 1943 it became the *Bureau of Agricultural and Industrial Chemistry*.

Entomology. Entomology early engaged the attention of those in charge of agricultural work and the services of an entomologist were utilized from time to time by the Patent Office. A Department entomologist was appointed in 1863, when the Division of Entomology was established. The Bureau of Entomology was created in 1904. Work in entomology was combined with that concerned with plant quarantine in 1934 and the *Bureau of Entomology and Plant Quarantine* resulted. Activities later carried on in the Bureau of Biological Survey originated in this bureau.

Meteorology. Studies of the weather and weather statistics naturally attracted the attention of those in charge of agricultural work quite early. Joseph Henry contributed articles on meteorology to the agricultural reports as early as 1857 and in 1863 the Department began to publish weather data it derived from the Smithsonian Institution. The first Commissioner of Agriculture suggested that weather reports be telegraphed in to the Department, compiled, and then sent out for the information of farmers. On February 4, 1870, the Congress authorized such a service but it was conducted by the Army Signal Corps for about 20 years. An act passed October 1, 1890, provided for the transfer of the *Weather Bureau* to the Department of Agriculture which transfer became effective July 1, 1891. In 1940 the Weather Bureau was transferred to the Department of Commerce. Departmental work on soils originated in this bureau.

Forestry. Forestry was much discussed in the report of the Commissioner of Agriculture for 1875, and in 1876 a forester was appointed. The Division of Forestry was organized by the Commissioner of Agriculture in 1881 and reorganized by Congress in 1886. A Bureau of Forestry was created in 1901. On February 1, 1905, custody of the national forests was transferred from the Department of the Interior and was combined with the forestry work of the Department of Agriculture as the *Forest Service*.

Veterinary Medicine and Farm Animals. The diseases of farm animals were much discussed in early reports of those in charge of agricultural work. Interest in animal breeding came later and, somewhat later still, in the nutrition of farm animals. While animal diseases received attention even when the agricultural work was still in the Patent Office, it was not until 1879 that a Department veterinarian was appointed and a Veterinary Division was established. Outbreaks of contagious pleuropneumonia, cattle tick fever, and foot-and-mouth disease soon focused national attention upon the problem of animal plagues and the *Bureau of Animal Industry* was created by act of Congress in 1884. It was the first unit of full bureau status in the Department.

Biology of Birds and Mammals. Economic ornithology and mammalogy began to be studied in the Division of Entomology in 1885 and a Division of Economic Ornithology and Mammalogy was set up in 1886. This became the Division of Biological Survey in 1896 and the *Bureau of Biological Survey* in 1906. This bureau was transferred to the Department of the Interior in 1939 and became part of the Fish and Wildlife Service in 1940.

Office of Experiment Stations. The Office of Experiment Stations had to be set up in 1888, after the Hatch Act had been passed by Congress in 1887, to supervise the cooperative work between the Department and the State agricultural experiment stations and the making of payments to the stations as authorized by that act. The agency became part of the States Relations Service in 1915 and, when this agency was abolished in 1923, the *Office of Experiment Stations* was established as an independent unit. The Department's work in home economics and on human nutrition originated in this agency.

Publications. All higher Department officials, particularly the first Commissioner and the first Secretary of Agriculture, realized the great importance of publishing agricultural information promptly. A Section of Records and Editing was set up in the Division of Statistics in 1889 and in 1890 it was reorganized as the Division of Records and Editing. It became the Division of Publications in 1895.

The service was much further improved in 1923, it was placed in the *Office of Information* when this unit was established in 1925 to handle press and publications work, and radio work followed in 1926.

Dairying. Dairy studies early occupied the attention of the Department. As an organized activity they were first carried on in the Bureau of Animal Industry about 1889. The Division of Dairying was created in that bureau July 1, 1895. An act of Congress passed 1924 established the Bureau of Dairying, in response to the desires of the dairy industry, and it became the *Bureau of Dairy Industry* in 1926.

Public Roads. The agricultural report for 1888 dwelt on the urgent necessity for study of road construction and in 1893 a special agent and engineer for road inquiry was appointed. The Office of Road Inquiry was established the same year. The Office of Public Roads was created in 1905 and it became the *Bureau of Public Roads* in 1918. In 1939 this work was transferred to the Federal Works Agency.

Home Economics. Subjects essentially in the field of what would now be regarded as home economics were discussed in the reports of the first Commissioner of Agriculture in 1862, 1863, and 1866. In 1894 the study of human nutrition was undertaken in the Office of Experiment Stations by special act of Congress. This and related work formed part of the States Relations Service created in 1915, and in 1923, when that agency was dissolved, the Bureau of Home Economics was formed as an independent unit largely in response to the wishes of groups of citizens who desired this. In 1943 it was reorganized to include the Division of Protein and Nutrition Research formerly of the BPISAE and became the *Bureau of Human Nutrition and Home Economics*.

Work on Soils. The analysis of soils was one of the first duties of early departmental chemists. In 1894 the Division of Agricultural Soils was set up in the Weather Bureau mainly to study the relation between soil and climate. It became an independent unit about 1895, and its name was changed to Division of Soils during the fiscal year 1896-97. The Division became the Bureau of Soils in 1901 and then was combined with the Bureau of Chemistry in 1927 to form the Bureau of Chemistry and Soils. In October 1938 soil research work was transferred to the Bureau of Plant Industry and all soil work relating to the action programs went into the Soil Conservation Service. In 1943 the former was transferred to the *Bureau of Plant Industry, Soils, and Agricultural Engineering*.

Agricultural Engineering. Studies of farm housing and plans for the building of better farm homes appeared in early agricultural reports -- 1842, 1859, and so on. The early reports also contained frequent discussions of newly patented agricultural machinery. But agricultural engineering work in the Department originated in the irrigation investigations undertaken by the Office of Experiment Stations in 1898. Research in land drainage followed in 1902. All this work was transferred to the Office of Public Roads in 1915. The Bureau of Agricultural Engineering was established in 1931; it included also the farm machinery studies once carried on in the Office of Farm Management. It was a short-lived unit for in October 1938 it was combined with a portion of the old Bureau of Chemistry and Soils as the Bureau of Agricultural Chemistry and Engineering. In 1943 it became part of the *Bureau of Plant Industry, Soils, and Agricultural Engineering*.

Extension Work. Farmers' cooperative demonstration work began in the Bureau of Plant Industry in 1904 and was transferred to the States Relations Service in 1914. Extension work was mentioned as such in the Reports of the Secretary beginning

in 1915. In 1923 when the States Relations Service was abolished the *Extension Service* became an independent unit.

Food and Drug Work. Work on foods naturally arose in the Department most concerned with our food supply. Food adulterations began seriously to engage departmental attention about 1880, and analyses of adulterated foods and drugs were published continuously thereafter until 1906 when the first Food and Drugs Act was passed and the Bureau of Chemistry was charged with its enforcement. This regulatory work was placed in a charge of a separate unit, the Food, Drug, and Insecticide Administration, in 1927, which also absorbed the duties of the Insecticide and Fungicide Board set up in 1911 to enforce the Insecticide Act. The unit became the *Food and Drug Administration* in 1930 and was transferred to the Federal Security Agency in 1940.

Quarantine. The Federal Horticultural Board was established in 1913 to enforce quarantine concerned with the spread of plant diseases. It was abolished in 1928 when the Plant Quarantine and Control Administration was created. In 1933 this unit became the Bureau of Plant Quarantine. In 1934 it was combined with the Bureau of Entomology, and the appropriations act of 1935 carried funds for the *Bureau of Entomology and Plant Quarantine*.

LIST OF COMMISSIONERS OF PATENTS, SUPERINTENDENTS OF AGRICULTURE
UNDER THE DEPARTMENT OF THE INTERIOR, COMMISSIONERS, SECRETARIES,
AND ASSISTANT SECRETARIES OF THE DEPARTMENT OF AGRICULTURE

<i>Name</i>	<i>Legal Residence</i>	<i>From</i>	<i>To</i>	<i>Born</i>
COMMISSIONERS OF PATENTS				
Henry L. Ellsworth	Conn.	July 4, 1836	May 4, 1845	Conn.
Edmund Burke	N. H.	May 5, 1845	May 8, 1849	Vt.
Thomas Ewbank	N. Y.	May 9, 1849	Oct. 31, 1852	England
Silas H. Hodges	Vt.	Nov. 1, 1852	Mar. 23, 1853	Vt.
Charles Mason	Iowa	Mar. 24, 1853	Sept. 8, 1857	N. Y.
Joseph Holt	Ky.	Sept. 9, 1857	May 6, 1859	Ky.
William D. Bishop	Conn.	May 7, 1859	Feb. 14, 1860	N. J.
Philip F. Thomas	Md.	Feb. 15, 1860	Mar. 27, 1861	Md.
David P. Holloway	Ind.	Mar. 28, 1861	June 30, 1862	Ohio

SUPERINTENDENTS OF AGRICULTURE UNDER THE DEPARTMENT OF THE INTERIOR

Thomas Green Clemson	---	Feb. 3, 1860	Mar. 4, 1861	Pa.
Isaac Newton	Pa.	Apr. 1861	June 30, 1862	N. J.

COMMISSIONERS OF AGRICULTURE

Isaac Newton	Pa.	July 1, 1862	June 19, 1867	N. J.
John W. Stokes	Pa.	June 20, 1867	Dec. 4, 1867	N. J.
Horace Capron	Ill.	Dec. 5, 1867	July 31, 1871	N. Y.
Frederick Watts	Pa.	Aug. 1, 1871	June 30, 1877	Pa.
William G. LeDuc	Minn.	July 1, 1877	June 30, 1881	Ohio
George B. Loring	Mass.	July 1, 1881	Apr. 3, 1885	Mass.
Norman J. Colman	Mo.	Apr. 4, 1885	Feb. 12, 1889	N. Y.

SECRETARIES OF AGRICULTURE

Norman J. Colman	Mo.	Feb. 13, 1889	Mar. 6, 1889	N. Y.
Jeremiah McLain Rusk	Wis.	Mar. 7, 1889	Mar. 6, 1893	Ohio
J. Sterling Morton	Nebr.	Mar. 7, 1893	Mar. 5, 1897	N. Y.
James Wilson	Iowa	Mar. 6, 1897	Mar. 5, 1913	Scotland
David Franklin Houston	Mo.	Mar. 6, 1913	Feb. 1, 1920	N. C.
Edwin Thomas Meredith	Iowa	Feb. 2, 1920	Mar. 4, 1921	Iowa
Henry Cantwell Wallace	Iowa	Mar. 5, 1921	Oct. 25, 1924	Ill.
Howard Mason Gore	W. Va.	Nov. 22, 1924	Mar. 4, 1925	W. Va.
William Marion Jardine	Kans.	Mar. 5, 1925	Mar. 4, 1929	Idaho
Arthur Mastick Hyde	Mo.	Mar. 5, 1929	Mar. 4, 1933	Mo.
Henry A. Wallace	Iowa	Mar. 4, 1933	Sept. 4, 1940	Iowa
Claude R. Wickard	Ind.	Sept. 5, 1940	June 29, 1945	Ind.
Clinton P. Anderson	N. Mex.	June 30, 1945	May 10, 1948	S. Dak.
Charles F. Brannan	Colo.	June 2, 1948		Colo.

<i>Name</i>	<i>Legal Residence</i>	<i>From</i>	<i>To</i>	<i>Born</i>
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UNDER SECRETARIES OF AGRICULTURE

Rexford Guy Tugwell	N. Y.	June 19, 1934	Dec. 31, 1936	N. Y.
Milburn L. Wilson	Mont.	Jan. 2, 1937	Jan. 31, 1940	Iowa
Claude R. Wickard	Ind.	Mar. 1, 1940	Sept. 4, 1940	Ind.
Paul H. Appleby	Va.	Sept. 5, 1940	Jan. 31, 1944	Mo.
Grover Bennett Hill	Tex.	Feb. 26, 1944	June 29, 1945	Tex.
John B. Hutson	Md.	June 30, 1945	Mar. 22, 1946	Ky.
N. E. Dodd	Oreg.	Apr. 8, 1946	June 7, 1948	Iowa
Albert J. Loveland	Iowa	June 30, 1948	Mar. 27, 1950	Iowa
Clarence J. McCormick	Ind.	July 28, 1950	----	Ind.

ASSISTANT SECRETARIES OF AGRICULTURE

Edwin Willits	Mich.	Mar. 23, 1889	Dec. 31, 1893	N. Y.
Charles William Dabney, Jr.	Tenn.	Jan. 1, 1894	Mar. 22, 1897	Va.
Joseph Henry Bringham	Ohio	Mar. 23, 1897	June 29, 1904	Ohio
Willet Martin Hays	Minn.	Dec. 21, 1904	Mar. 7, 1913	Iowa
Beverly Thomas Galloway	Mo.	Mar. 17, 1913	July 31, 1914	Mo.
Carl Schurz Vrooman	Ill.	Aug. 17, 1914	Dec. 31, 1918	Mo.
Raymond Allen Pearson	Iowa	Aug. 21, 1917	Aug. 22, 1918	Ind.
George Irving Christie	Ind.	Oct. 14, 1918	June 30, 1919	Canada
Clarence Ousley	Tex.	Aug. 21, 1917	July 31, 1919	Ga.
James Reed Riggs	Ind.	Sept. 22, 1919	Mar. 31, 1920	Ind.
Elmer Darwin Ball	Iowa	(June 12, 1920 Mar. 12, 1921)	Mar. 4, 1921) Sept. 30, 1921)	Vt.
Charles William Pugsley	Nebr.	Oct. 1, 1921	Sept. 14, 1923	Iowa
Howard Mason Gore	W. Va.	Sept. 17, 1923	Nov. 21, 1924	W. Va.
Renick William Dunlap	Ohio	Apr. 1, 1925	Mar. 6, 1933	Ohio
Rexford Guy Tugwell	N. Y.	Mar. 7, 1933	June 18, 1934	N. Y.
Milburn L. Wilson	Mont.	July 2, 1934	Jan. 1, 1937	Iowa
Harry L. Brown	Ga.	Jan. 2, 1937	Dec. 5, 1939	Ga.
Grover Bennett Hill	Tex.	Dec. 21, 1939	Feb. 25, 1944	Tex.
Charles F. Brannan	Colo.	June 21, 1944	June 2, 1948	Colo.
Knox P. Hutchinson	Tenn.	Aug. 5, 1949	---	Tenn.

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